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# HANDBOOK

OF THE

# HOSPITAL CORPS

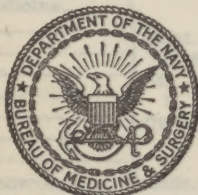
UNITED STATES NAVY

1949



PUBLISHED BY  
U.S. THE BUREAU OF MEDICINE AND SURGERY

UNDER THE AUTHORITY OF  
THE SECRETARY OF THE NAVY



UNITED STATES  
GOVERNMENT PRINTING OFFICE

WASHINGTON : 1949

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## PREFACE

This *Handbook of the Hospital Corps, U. S. Navy, 1949*, is approved for official use as a basic guide in the instruction of Hospital Corpsmen and in the performance of their duties.

As described by the Editors in their introduction, this work contains only fundamental material and is to be supplemented by numerous professional books and manuals, some of which are listed in the Appendix to the Handbook as a sort of "Five-foot Shelf."

The Divisions of Preventive Medicine, Nurse Corps and Publications in the Bureau of Medicine and Surgery cooperated in the production of the various sections of the *Handbook*. Authors of sections or parts of sections were:

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Practical Preventive Medicine-----	
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Nursing Procedures-----	Lt. Comdr. Martha E. Page (NC), U. S. N.

Material used in the curricula of the Hospital Corps Schools at both San Diego, Calif., and Portsmouth, Va., was employed by various authors. Many standard textbooks have been consulted for general information. The illustrations are the original drawings of Lieutenant John A. McCalley (HC), U. S. N. (FR), of the Medical Statistics Division of the Bureau of Medicine and Surgery, who was aided by Mr. Ray Stevens. Mr. Henry C. Thomson of the Division of Publications contributed valuable advice regarding the placing of illustrations and the typography.

The Editors of the *Handbook* were Captain Louis H. Roddis (MC), U. S. N. and Lieutenant (jg) W. Kenneth Patton (MSC), U. S. N., who were responsible for the general plan, format and also the appendices.

CLIFFORD A. SWANSON,  
Rear Admiral (MC),  
Surgeon General, U. S. Navy.

U. S. N.	First Aid and Minor Surgery
U. S. N.	Emergency Dental Treatment
U. S. N.	Hospital Gorgemen with Marines in the Field
U. S. N.	Preventive Medicine: Personal Hygiene
U. S. N.	Practical Preventive Medicine: Water
U. S. N.	Food
U. S. N.	Waste Disposal
U. S. N.	Housing
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U. S. N.	Ventilation
U. S. N.	Lighting
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U. S. N.	Immunization Procedures
U. S. N.	Robert Control
U. S. N.	Industrial Hygiene Health Hazards
U. S. N.	Nursing Procedures

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## INTRODUCTION

The first book for the instruction and guidance of hospital corpsmen was the small paper-covered volume of 194 pages, easily slipped into the pocket and readily carried in the ditty box or sea bag. This was published in 1914. It contained practical information for the hospital corpsman that he could easily be applied to problems of sanitation, first aid and nursing. Succeeding editions of the Handbook of the Hospital Corps, as this book was called, became larger and larger until finally the Handbook was a bulky volume of 1,130 large pages. This was the Handbook of 1939.

It is felt that this Handbook has become too large and unwieldy for easy use under the conditions of naval life, and furthermore the extent of knowledge required and the development of special technical branches make a single volume inadequate. There is, therefore, in the present Handbook a return to the smaller form that contains only basic knowledge on a few fundamental subjects. Detailed knowledge of special technician's training must be obtained from books dealing exclusively with the special field.

The present Handbook is divided into three parts: One section is devoted to "First Aid and Minor Surgery," another to "Nursing Procedures" and the third "Preventive Medicine." An appendix contains a list of all United States Pharmacopoeia and National Formulary drugs with English and Latin titles, and the dosage; a poison table; notes on independent duty; and some other useful features. A list of necessary books for reference and supplementary study are included.

The size, shape, and binding have been selected as suitable for easy handling and stowing. A flexible cover, resistant to tropical fungi, and attacks by insects and dampness, has been used.

## MEDICAL DEPARTMENT OF THE NAVY

The basic responsibility of the Medical Department is the maintenance of the health of the Navy, either by preventive measures or by curative processes.

The assignment of Medical Department personnel to ships of the fleets and to activities ashore is predicated on that purpose. Each officer and enlisted man of the Medical Department contributes to the realization of that aim, acting individually or as a "member of the team."

The Medical Department is as old as the Navy itself. Although its organization has undergone innumerable changes, its personnel have existed only to care for the sick and injured—"to keep as many men at as many guns as many days as possible."

The personnel of the Medical Department are variously members of five distinct corps:

1. *Medical Corps*—Comprised of officers who are graduates of approved schools of medicine.
2. *Dental Corps*—Comprised of officers who are graduates of approved schools of dentistry.
3. *Medical Service Corps*—Comprised of officers who are graduates of approved schools of medical sciences, allied to medicine, or have demonstrated proficiency in naval medical administrative procedures and have been promoted from the ranks of the Hospital Corps.
4. *Nurse Corps (Female)*—Comprised of officers who are graduates of an approved school of nursing, and who are registered nurses.
5. *Hospital Corps*—Comprised of officers and enlisted men and women who have demonstrated an adaptability to perform duties incident to their rank or rate.

The general duties and responsibilities of a hospital corpsman require that he possess certain physical, mental, and moral qualifications: First, he must have good health, strength, and endurance; second, his mental attitude is dependent upon education, judgment, the faculty of observation, a sense of order, and a good memory; and third, his moral character should include truthfulness, obedience, dignity, tact, courtesy, sympathy, and economy.

The enlisted hospital corpsman is the direct "contact man" between the patient and the medical officer. The impression he

makes will influence, to a large extent, the attitude of the patient. Therefore it is necessary that the hospital corpsman be of high caliber.

Advancement in rating and eventual promotion to officer status is dependent on the application of the individual hospital corpsman to continued improvement. Study of the Handbook and other standard texts is essential. Good study habits formed early will pay dividends later.

## FIRST AID AND MINOR SURGERY

*First Aid* is the emergency treatment of the sick and injured before regular medical or surgical attention can be given. Literally, and especially under combat conditions, it means carrying out the procedures that are necessary to protect the life of the injured, to prevent further injury, and to make him as comfortable as possible, until he is moved or until he can be placed under the care of a medical officer.

*Minor Surgery* is that branch of surgery which in general includes procedures not endangering life. These include the application of bandages, dressings, splints, sutures, and similar simple repair procedures.

*Major Surgery* which includes delicate or extensive procedures only undertaken by a medical officer. It requires both exact diagnosis and skillful operative technic.

### Fundamental Principles of First Aid

When a hospital corpsman is required to administer first aid to the sick or injured he should do his work with the assurance that comes from knowing *what to do, how to do it, and when to do it*. Also, **WHAT NOT TO DO!** He should work calmly, without hesitation, and as quickly as is consistent with the safety of the patient.

Under combat conditions, he frequently is left to his own resources and sometimes encounters situations beyond his skill but when life is at stake he does what he can in the best way he knows. He should follow these general rules:

1. Be quiet and cool, don't get excited, and do the best possible with the facilities at hand.
2. Send for a medical officer (if available). Have someone keep bystanders away.
3. Keep the patient lying down in a comfortable position on a blanket or a substitute material.
4. Look for hemorrhage. **TREAT THIS FIRST!**
5. Is the patient breathing? Loosen clothing that might interfere with breathing. Check the mouth for loose dentures or foreign bodies. Pull the tongue forward if necessary to obtain free breathing.
6. Determine character of pulse.
7. Combat and prevent shock. Often when serious injuries occur, emergency treatment should consist of doing nothing other than keeping the patient comfortable, warm, and quiet.

8. Locate all injuries. Remove only the clothing necessary to examine the injury. Clothing must be removed in such a way as to disturb the patient as little as possible. If necessary, the outer clothing should be ripped up the seam and the under clothing torn or cut. In removing shoes it is often necessary to cut them off when they cannot be removed otherwise without causing great pain or increasing the injury.

9. Poisoning is often accompanied by chemical burns of the lips, severe pain in the stomach, and the odor of alcohol or poison on the breath. Know the antidotes!

10. If a bone is broken apply a splint before moving the patient.

11. If there is vomiting, turn the patient's head to one side so the vomited material may escape easily from the mouth. This eliminates the risk of the vomitus choking the patient.

12. Prepare the patient for safe transportation.

13. Note the time and place of accident; gets the facts from bystanders as to what happened. Get the names and addresses of any witnesses.

### ***General Precautions***

1. If the patient is conscious, he can generally tell you where his injuries are.

2. If the patient is unconscious, or semi-conscious, following an accident, an injury to the head is usually the cause.

3. Keep calm! Do not be hurried into moving the patient unless he is in a dangerous location. Too much moving about causes shock and further injuries.

4. Never give an unconscious patient water or other liquids as he cannot swallow and may suffocate.

5. Never give stimulants to the injured under these conditions:

(a) If the patient has a head injury.

(b) If the patient has a strong pulse and a red face, as in cases of a sunstroke.

(c) In cases of hemorrhage, until bleeding is controlled.

6. Never give morphine to head injury cases.

7. Talk to the patient and try to allay his fears, but do not talk too much.

8. The first-aid man's job is as much to protect the victim from further injury as it is to care for him.

### ***Use of Morphine***

Morphine requires special mention because it depresses pain sensation and for this reason is extremely valuable in the treatment of wounds, shock, burns, and pain. However, too large a dose will cause slowing of respiration, unconsciousness, and even death. Some of the symptoms of toxic effects are:

1. Depression of depth and rate of respiration through direct effect on the respiratory center in the brain.

2. Contraction of the pupils, which may be very marked, and is a valuable warning of overdosage.

3. Nausea.

4. A morphine syrette contains  $\frac{1}{2}$  grain of morphine. Avoid giving a slightly wounded man a  $\frac{1}{2}$  grain of morphine which may convert a walking wounded into a stretcher case.

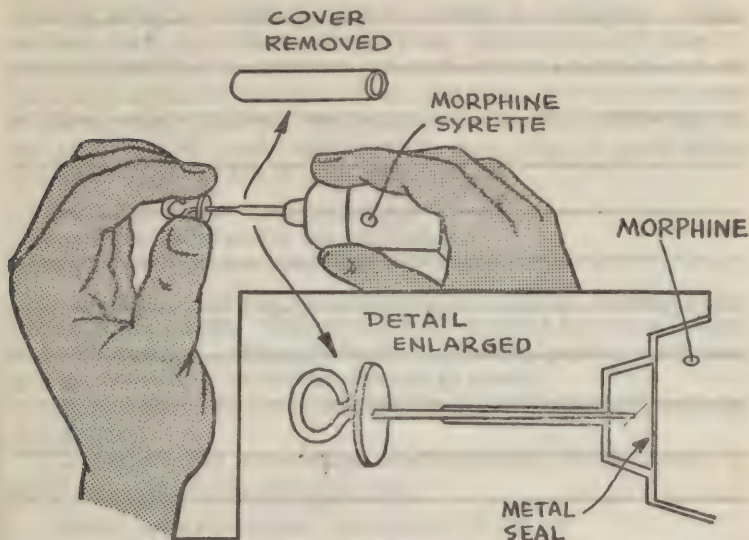


FIG. 1.—Breaking the seal of a syrette.

The technic of administration of a morphine syrette:

1. Paint iodine or other antiseptic on an uninjured skin area. The outer side of the arm or thigh are the best places.

2. Grasp the tube of the syrette at its neck with your finger tips. Remove the shield. Hold the wire by the loop, push it through the needle to break the seal, then discard the wire.

3. Force the needle through the skin into the flesh beneath.

4. Squeeze out the contents of the syrette.

5. Withdraw the needle and discard it.

6. Note the time of injection on a tag and tie it to the injured man's identification disk.

7. Give patient one injection of morphine. After the initial dose of morphine is given, even in seriously injured persons,  $\frac{1}{4}$  gr. of morphine ( $\frac{1}{2}$  of a syrette) every 3 or 4 hours represents a maximum safe dosage, except in rare instances.

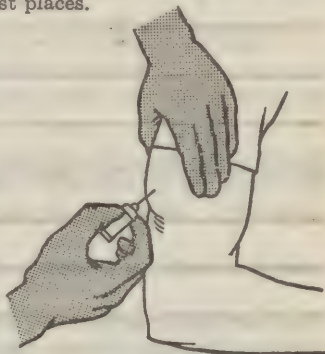


FIG. 2.—Administration of a syrette.

## NOTES

## HEMORRHAGE AND ITS CONTROL

*Hemorrhage* is bleeding—it is the escape of blood from the arteries, veins, or capillaries due to a break in their walls. Hemorrhage takes precedence over all other emergencies and must be treated **FIRST**. The patient's life may depend on speed and efficiency in arresting the hemorrhage, and must be done at the scene of the accident. Arterial bleeding is by far the most important as the rapid flow of blood under pressure may result in death unless checked. Hemorrhage is classified as:

Arterial: The blood is bright red and spurts out.

Venous: The blood is dark red and flows out.

Capillary: The blood is bright red and oozes out.

Bleeding is stopped by the formation of a clot in the ends of the injured blood vessels. The normal time required for a clot to form is 3 to 5 minutes. (Hemophiliacs, or bleeders, require more time and the bleeding is sometimes difficult to check).

**REMEMBER! DO NOT DISTURB A CLOT WHILE CHECKING BLEEDING!**

The symptoms of hemorrhage vary depending on the amount of blood lost. Generally, however, the

1. Skin is moist and clammy, accompanied by pallor;
2. Pulse rate will be increased, feeble in nature, easily compressible and lost;
3. Blood pressure will be lower;
4. Temperature may be subnormal;
5. Pupils are dilated and slow in reacting to light;
6. Ears ring (tinnitus);
7. Patient may display anxiety with restlessness and twitching;
8. Patient may have air hunger, with marked yawning;
9. Patient may have impaired vision (the greater the loss of blood the greater the vision will be dimmed).

The average person weighing 150 pounds will have about five or six quarts of blood in his blood vessels. The loss of two pints may be very serious. The loss of three pints may be fatal. The first-aid man must work fast.

Pressure is the basic principle of the first-aid treatment of hemorrhage. Two methods are used:

Direct pressure—Most bleeding can be controlled by placing a sterile gauze pad directly over the wound and bandaging it securely in position. If necessary, pressure can be applied with the hand directly over the gauze pad until bleeding stops.

To aid in clot formation, the patient should be kept at rest, lying down. Movement will stimulate the circulation of blood and

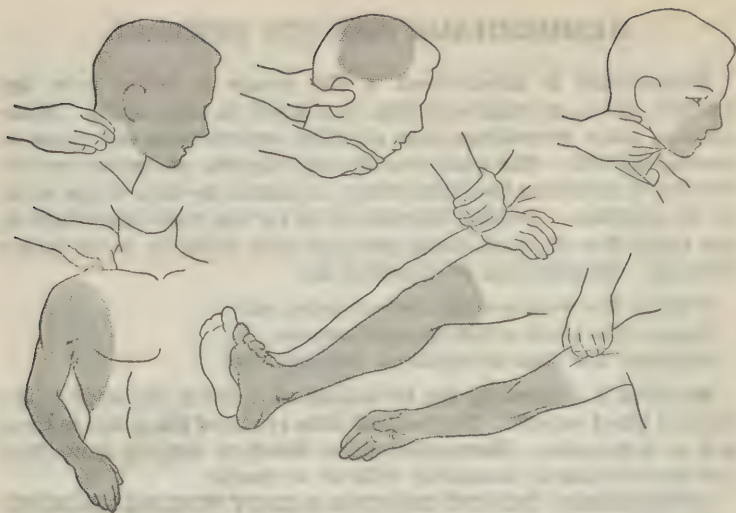


FIG. 3.—Major digital pressure points.

cause more bleeding; also elevation and rest of the wounded part decreases the flow of blood and assists clotting.

If bleeding continues put fresh compresses over the old. Do not remove old compresses as clotting may be disturbed. If a large artery is cut and the hemorrhage cannot be controlled by compresses then digital pressure must be resorted to.

Digital pressure—The pressure applied with the fingers over the course of the main artery supplying blood to the injured part. Pressure is applied at a point between the heart and the wound where the artery is near the surface of the skin and lies over a bone. Correct digital pressure will stop arterial bleeding but it is temporary, awkward, tiring, and is used only until a tourniquet or some other improvisation can be obtained.

The six major digital pressure points for severe arterial bleeding are:

1. For bleeding from the region of the temple and scalp—apply pressure at a point just in front of the ear on the same side of the head where the wound is. This presses the main artery to the temple against the skull.
2. For bleeding from the cheek, below the level of the eye—apply pressure to a point on the lower edge of the jaw bone. Starting at the angle of the jaw, run the finger forward along the lower edge of the jaw until a small notch is found. The pressure point is at this notch.
3. For bleeding from the neck—apply pressure below the wound just in front of the prominent neck muscle. Press inward and slightly backward,

thereby compressing the main artery on that side of the neck against the bones of the spinal column.

4. For bleeding from the shoulder or upper part of the arm—apply pressure with the fingers in back of the inner third of the collar bone, thereby compressing the main artery to the shoulder against the first rib.

5. For bleeding from the upper arm, forearm, and hand—apply pressure with the fingers on the inner side of the upper arm, about one-half way between the shoulder and elbow, thereby compressing the artery against the bone of the upper arm.

6. For bleeding from the thigh, leg, and foot—apply pressure in the middle of the groin with the heel of the hand, thereby compressing the main artery of the lower limb against the pelvic bone.

When trying to control bleeding, fingers or dirty cloths should not touch the wound because of the danger of infection. However, in an emergency if no sterile gauze is available and if everything else fails, apply pressure directly to the wound.

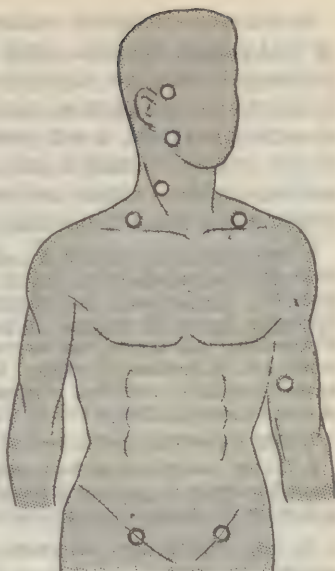


FIG. 4.—Pressure points.

### *Tourniquet*

A tourniquet should not be applied to a limb until all other measures have failed. These measures include the application of a pressure dressing to the wound, elevation of the part, and digital pressure over the artery above the bleeding point.

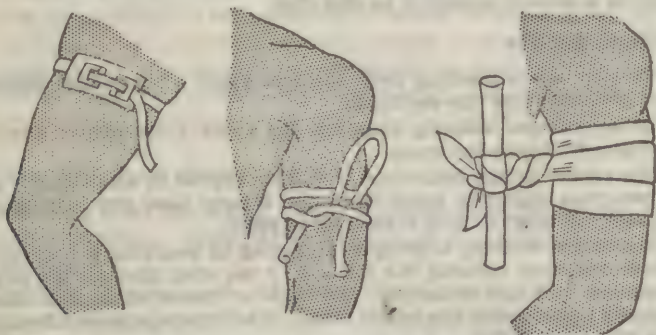


FIG. 5.—Types of tourniquets. Cotton webbing, rubber tubing and Spanish windlass.

A tourniquet properly applied interrupts the entire blood supply of that part of the limb which is below the point of its application. Although it may be a life-saving measure, it is not without danger. It should be tied tight enough to control bleeding but no tighter. If applied too tight, it will permanently injure nerves and muscles. If left on continuously it will result in damage to the tissues from inadequate blood supply and gangrene of the extremity will result. Follow these three important rules:

1. The tourniquet **MUST** be released at the end of 20 minutes. After loosening the tourniquet it should be left in position until it is determined that the hemorrhage has stopped. If bleeding recurs, it should be tightened again for another 20 minutes and the procedure repeated. If hemorrhage has ceased, the tourniquet should be left loosely in place in readiness for further bleeding. The only occasion when a tourniquet is never loosened or removed is when an extremity has been torn off. Then the tourniquet is always left in place near the injured area.

2. Don't leave the patient—stay with him until help arrives.

3. If the patient is to be moved with the tourniquet in place, tag or mark the patient, plainly indicating that a tourniquet has been applied and state the time of its application.

In an emergency, tourniquets may be improvised from such articles as a belt, neckerchief, or any piece of cloth folded to make a flat band at least an inch wide and 40 to 50 inches long. An improvised tourniquet made of a neckerchief is applied by wrapping the cloth band twice about the limb and tying a half knot. A short stick or similar object is then placed on the half knot and a square knot tied over it. The stick is then twisted rapidly to tighten the tourniquet and stop the flow of blood. The tourniquets furnished in the Navy first-aid kits are of two types—a rubber tourniquet and a cotton webbing tourniquet which is tightened by means of a buckle attached to one end.

### *Directions for Use*

1. To stop severe bleeding from the arm apply a tourniquet about a hand's breadth below the shoulder.

2. To stop severe bleeding from the leg apply a tourniquet about a hand's breadth below the groin.

3. The rubber tubing tourniquet is quickly applied by stretching it and then wrapping it tightly twice about the injured limb and looping one end under the other to hold it securely in place.

4. The cotton webbing tourniquet is applied by wrapping it once about the limb, and then running the free end of the strap through the slit in the felt pad and thence through the buckle. The strap is then drawn sufficiently tight to stop the flow of blood. The skin is protected from the buckle by a piece of felt.

**DON'T FORGET THE DANGERS OF A TOURNIQUET!**

## ***Shock in Hemorrhage Cases***

Shock is present in all cases of severe bleeding and must be treated as soon as an attempt has been made to control hemorrhage. Loss of body heat must be prevented by sufficient dry coverings for the body and limbs. However, it is harmful to overdo this. Excessive heat might well add to exhaustion and increase shock. Excessive weight of coverings might interfere with breathing. Pain should be alleviated by securing a comfortable position and by the immobilization of any broken bones. Morphine may be administered in moderate amounts ( $\frac{1}{4}$  to  $\frac{1}{2}$  grain) except in cases with head injuries. Aromatic spirits of ammonia is an excellent reflex stimulant, and may be applied to cotton, gauze, or a handkerchief for inhalation.

## ***Replacement of Lost Blood***

Fluids to maintain blood volume should be supplied as soon as possible to prevent shock. Normal human blood plasma injections have saved thousands of lives. Serum albumin, which comes in smaller containers than plasma and is much simpler to prepare for injections, is especially adapted for use in the field. If neither of these fluids are available, a solution of dextrose, 5 percent or normal saline solution (a solution of 8.5 Grams of sodium chloride in 1,000 cc. water) should be given intravenously. The object:

1. To prevent the blood pressure from falling to a dangerous low level by replenishing the lost fluid and;
2. If the blood pressure has already fallen to such a low level, to bring it up as quickly as possible.

Under battle conditions, many men also suffer from tissue dehydration. In addition to the intravenous injections as listed above, it is essential that fluids be given by mouth. Normal saline solution is of great value in treatment of shock whether given by vein or by mouth. It should be given by mouth as an adjunct to plasma or any other intravenous injection and is particularly valuable when plasma is not available. If normal saline solution is not available, salt tablets may be taken by mouth followed by water.

## ***Hemorrhage From Specific Points***

*Bleeding from the scalp:* Apply pressure over the wound with a sterile compress. The cravat bandage of the head works well in these cases.

*Arterial bleeding from the lips:* Grasp the lip with thumb and finger on both sides of the wound. Sutures generally are necessary.

*Bleeding from the face:* Apply digital pressure on the facial artery under the lower jaw between the ear and chin. Then use a

tightly bandaged compress. Sutures are often used in such cases. They help to control hemorrhage and prevent scars.

*Bleeding from the nose (Epistaxis) :*

1. Have the patient sit with head thrown slightly back, breathing through the mouth. Loosen collar and anything tight around the throat. *Do not have him bend over a basin.*

2. Apply cold, wet compresses over the nose.

3. Holding sides of nose together sometimes aids clot in forming. Patient must avoid blowing nose.

4. It sometimes helps to apply cold compresses to the back of the neck.

5. In severe cases the nose is gently packed with strips of bandage soaked in a solution of epinephrine (Adrenalin) 1:1000.

6. If these methods fail call a medical officer.



FIG. 6.—Stopping hemorrhage from arm, forearm and hand.

NOTE: A simple method to stop a nose bleed is to fold a small piece of paper or gauze about an inch in length and place it under the upper lip. By drawing the lip tight or by applying digital pressure, it compresses the small capillaries to the nose and decreases the flow of blood.

*Arterial hemorrhage from arm, forearm, and hand:* Apply digital pressure on the brachial artery and then apply a tourniquet between the wound and the body. In case of severe hemorrhage of the forearm, a pad may be placed in the bend of the elbow

and the arm force-flexed over it and secured. (Fig. 6.) For hemorrhage of the palm of the hand a compress can be placed in the palm of the hand and the fingers closed tightly over it and bandaged. (Fig. 7.)

*Hemorrhage of the groin and thigh, leg, and foot:* A high femoral artery wound cannot be controlled with a tourniquet but the artery in the groin can be compressed with the heel of the hand or the fist. Hemorrhage from wounds lower in the thigh may be controlled first by pressure on the artery in the groin and then by tourniquet. Severe hemorrhage in the leg or the foot may be controlled by a tourniquet or by placing a pad in the bend of the knee and force-flexing the knee, strapping it securely in that position. (Fig. 8.)

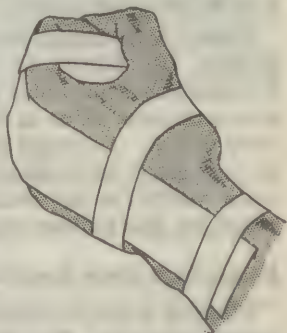


FIG 7.—Stopping hemorrhage from palm of hand.

*Hemorrhages from the stomach (hematemesis) and the lungs (hemoptysis):* These conditions are considered together as they are often confused. Expecterated blood may come from either or both organs, and may be vomited directly from the stomach or may have come from the lungs and been swallowed. Blood from the stomach is usually dark and clotted. Blood from the lungs is red and frothy.

1. Place patient in a recumbent position and keep him quiet.
2. Morphine is usually prescribed to relax the patient.
3. Cold compresses or an ice bag should be applied to the upper abdomen or lower part of the chest.
4. Give nothing by mouth except a little cracked ice.
5. Use no stimulants.
6. In hemoptysis the patient may be turned on the affected side to prevent the blood from entering the unaffected lung. In severe hemorrhage the head should be lower than the feet.

*Bleeding from the neck:* Apply digital pressure to the carotid artery at once. Use a compress under the fingers as the neck soon becomes slippery from blood. If bleeding continues apply pressure above as well as below the wound.

If it is necessary to maintain pressure on the side of the neck or upper shoulder, place a pad of adequate size over the area where pressure is desired; lay the center of a cravat bandage over this pad and tie it under the opposite axilla. Insert a second cravat under the first at about the midline in front and in behind, and tie tightly under the axilla on the injured side (Fig. 9).

When it is necessary to control bleeding of the arm or upper shoulder by continuous pressure of the axillary artery, the following method is recommended: Make a round pad to fit snugly into the axilla and large enough to protrude below it so pressure can be applied. Place the center of a cravat bandage under the pad, and bring both ends up and cross them over the shoulder. Pull the ends tight until enough pressure is exerted on the pad to control bleeding, then



FIG. 8.—Stopping hemorrhage from leg and foot.

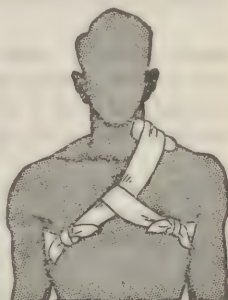


FIG. 9.—Stopping hemorrhage from neck.

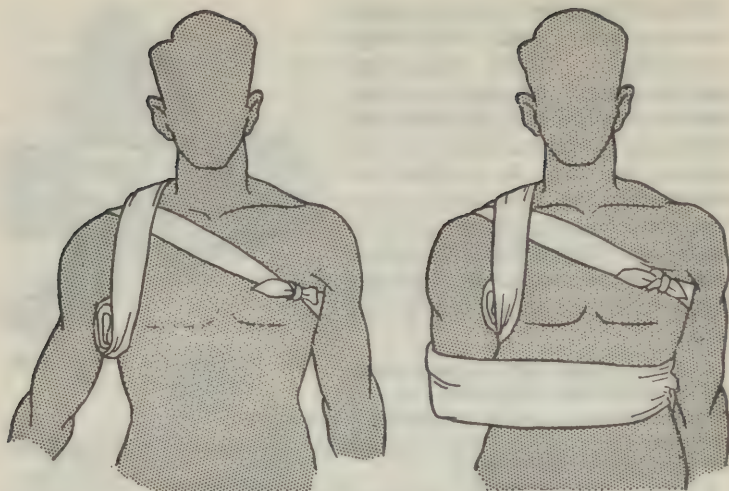


FIG. 10.—Stopping hemorrhage from axillary region.

bring them across the chest and back and tie under the opposite axilla. Place the injured arm at right angles on the upper abdomen, and bind the arm to the body with a second cravat bandage as shown in Fig. 10.

## SHOCK

*Shock* is a sudden depression of all the vital functions of the body due to the failure of circulation. It is the result of an injury and is a common complication of burns, crushing injuries, compound fractures, and severe wounds. For this reason it is often called traumatic shock.

There are two forms of shock: primary and secondary. Primary shock occurs at the time of the injury and is usually not serious. Secondary shock occurs later and it is the dangerous form. It is the secondary shock that the first aider tries to prevent. It is this type of shock that is discussed here.

This depression from shock may be caused by the actual loss of blood by hemorrhage, by loss of blood plasma, or by failure of blood vessels to maintain their tension and elastic tone. This results in an accumulation of the blood in the large abdominal vessels. The blood pressure drops as a result of this depression in circulation. The heart beats faster and faster in its attempt to restore normal circulation and raise the pressure. The surface blood vessels contract, especially in the arms and legs, in an effort to counteract the deep circulatory weakness. This contraction causes the skin to become cold and clammy. At the same time the deeper capillaries and veins become dilated and their walls more permeable.

Increased capillary permeability permits the escape of blood plasma through the vessel walls into the tissues, leaving a concentration of blood corpuscles and poisonous toxins in the vessels with a resulting further impairment of circulation. This develops into the dangerous condition previously referred to as secondary shock. Early plasma injections are important as they dilute the concentrations of corpuscles and toxins in the vessels, replenish the lost fluids, and thereby help overcome shock.

Shock following minor injuries is usually mild; however, shock brought about by more severe injuries is very serious, and is frequently the cause of death. REMEMBER, shock, if it is not treated can cause death even though the body injury is not of a type which ordinarily would prove fatal.

*All injured, unless there is hemorrhage or they have stopped breathing*, should be treated for shock before the actual body injury is treated. The more serious the injury, the more important it is to treat shock promptly.

The recognition, prevention and treatment of shock is one of the most important duties of the hospital corpsman.

### *Symptoms of Shock*

1. Early shock—there is a feeling of weakness, faintness, dizziness and often nausea.

2. General typical appearance—at first pale, then ashen. The skin is cold and clammy from perspiration. In some cases there is cyanosis or “black and blueness” due to the delayed filling of the surface blood vessels, especially in the arms and legs.

3. Expression of acute anxiety, restlessness and apprehension.

4. Complaint of thirst, due to loss of blood.

5. Pupils are dilated and eyes have a glassy or vacant stare.

6. The heart sounds are faint and distant.

7. Rising pulse rate. In severe cases it may rise to 160 or more per minute, becoming at the same time weak and thready.

8. Respirations become faint, shallow, rapid, sighing, and gasping.

9. The blood pressure drops as a result of the depression in circulation. This is one of the most constant features of a developing shock. There is a so-called “dangerous blood pressure level” near 50 mm. of mercury. If a patient’s blood pressure remains below this critical level for a number of hours, the resulting lack of adequate flow of blood to the brain and other body-tissues may produce irreparable damage, after which no form of treatment can save the patient’s life.

10. At first the patient appears calm and rational, but as the state of shock progresses and there is deficient circulation to the brain, greater stimuli are necessary to produce any response from the patient. Soon he is in a state of mental confusion and finally becomes stuporous.

### *Treatment of Shock*

It is of paramount importance that the treatment of shock be commenced at the earliest possible moment so as to limit its severity to a minimum. Prolonged deep shock may produce such extensive damage that subsequent treatment cannot save the patient’s life. First-aid treatment should consider the prevention as well as the therapy. The emergency treatment requires:

1. Bleeding must be stopped at once by methods described under hemorrhage.

2. Placing the patient in the proper position, which should be a horizontal position with head lowered. The circulation in shock is unstable, and placing the patient in this position provides for a flow of blood to the brain. Rest and quiet are essential. (Treat the cause at the same time).

3. Keep the patient warm by use of blankets or some substitute. A warm drink may be given the patient if he is conscious. Do not warm the patient with artificial means—such as hot-water bottles—because in warming the body by this method the blood is drawn to the surface of the skin and away from the vital organs.

4. *Morphine*: If the patient is conscious give  $\frac{1}{4}$  to  $\frac{1}{2}$  grain of morphine by hypodermic injection (one syrette contains  $\frac{1}{2}$  grain). If the restlessness and pain continue after a reasonable length of time (30 to 45 minutes) a  $\frac{1}{4}$ -grain additional dose may be necessary to relieve pain and is essential to prevent further shock. However, in the average case it will not be necessary to repeat the morphine in less than a 4-hour interval, and then only if the pain demands it. Caution must be observed in repeating morphine injections, as an overdose will cause a depression of the depth and rate (under 15 per minute) of respiration through direct

effect on the respiratory center. Contraction of the pupils (pin point in size) which may be very marked, is valuable warning of overdosage. Patients with head injuries who are conscious and in pain may be given phenobarbital, grains  $1\frac{1}{2}$  (if available) instead of morphine.

**NOTE:** All patients to whom morphine is given should be marked with an "M" on the forehead or this information must be accurately recorded on the Emergency Medical Tag.

5. *Fluid replacement:* Fluids to reestablish an effective blood volume and pressure to normal should be supplied as soon as possible. Normal blood plasma injections are most universally used. Serum albumin, which comes in smaller containers than plasma, is especially adapted for use in the field. If neither of these fluids is available, 1,000 cc. of a solution of 5 percent dextrose or normal saline should be given intravenously. In most circumstances whole blood is the ideal fluid for this purpose, but because of its nature it is difficult to preserve, supply, and administer. Its administration is limited to the medical officer.

6. Hot tea or coffee may be given in small amounts if the patient is conscious. Never give alcoholic drinks.

7. Fractures should be immobilized before moving the patient. This reduces pain and lessens damage to soft tissues. Emergency treatment of burns and wounds should be undertaken before moving the patient.

8. Early transportation to the dressing station or hospital will greatly better the patient's chance for a prompt recovery.

## Electric Shock

*Electric Shock* is the result of exposing the body to a powerful current of electricity and may occur from contact with "live wires" or through the effects of lightning. The symptoms and signs vary considerably:

1. Patient usually feels he has received a sudden blow, or
2. May utter a shriek, or a peculiar sound, or
3. Falls unconscious, or
4. Muscular spasm may cause him to remain claspng the wire with inability to let go.
5. Shock.
6. Burns at site of contact and exit of current.

### Treatment

1. Remove the patient from the electrical contact at once, but **DO NOT ENDANGER YOURSELF**. This may be done by throwing the switch, if near by, cutting the wire with an axe having a wooden handle, or by the use of a dry stick, rope, leather belt, coat, blanket, or any other non-conductor of electricity. Protect your eyes from the flash when breaking a circuit.

2. Keep the patient lying down in a comfortable position.

3. Loosen the clothing about the patient's neck and abdomen so that he can breathe freely. If he is breathing, protect him from exposure to cold, watch him carefully.

4. If the patient is not breathing, it is necessary to apply artificial respiration even though he appears to be dead and colorless.

5. In this condition the heart is very weak and any sudden muscular effort or activity on the part of the patient may result in heart failure. So keep him quiet and flat.

6. Send for a medical officer.

7. Do not give stimulants nor opiates. Do not feel free to leave him alone until he is under adequate medical supervision.

8. If the patient is breathing, but in shock, treat for shock. (Electric shock is treated in the same manner as traumatic shock.)

## Standard Army and Navy Package of Normal Human Plasma, Dried

### *Instructions for Use*

1. Open metal cans with attached keys.
2. Remove plasma and water bottles. Cleanse stoppers with alcohol.
3. Remove cellophane from double-ended needle and remove glass tube from one end of needle.
4. With water bottle in upright position insert uncovered end of double-ended needle through stopper into the water bottle.
5. Remove cellophane and glass tube covering airway needle of airway assembly and insert the needle through rubber stopper into water bottle.
6. Elevate free end of airway assembly. Prevent water from wetting cotton filter in airway: CAUTION: If cotton in airway filter becomes wet, remove it.
7. Remove glass tube from other end of double-ended needle. Invert water bottle and insert needle through stopper into plasma bottle.
8. Allow water to be drawn into plasma bottle. CAUTION: If vacuum in plasma bottle is lost, apply pressure in water bottle by forcing air into airway tube. If this method fails, remove stoppers and pour water into plasma bottle. Replace stopper on plasma bottle and continue immediately.
9. After water is added, double-ended needle is removed from plasma bottle.
10. Shake plasma bottle until plasma is completely dissolved.
11. Apply metal clamp to 4-inch piece rubber tubing on the intravenous set and close it.
12. Remove coverings from short needle attached to intravenous set and insert through stopper of plasma bottle.
13. Withdraw needle of airway assembly from water bottle and insert through stopper into plasma bottle.
14. Invert plasma bottle and suspend it for administration.
15. Fix glass end of the airway assembly with suspension tape above the inverted plasma bottle.
16. Remove cellophane from observation tube and intravenous needle.
17. Attach intravenous needle to tube and remove glass tube from needle.
18. Loosen metal clamp and allow plasma to fill rubber tubing. When tube is filled, and free of air bubbles, tighten metal clamp.
19. Insert needle in vein and regulate flow with screw clamp. If patient is to receive additional plasma, restore second bottle as outlined. Close regulating clamp as soon as first bottle is empty, but before air enters tube, pull out needles from first bottle and insert in second bottle. Elevate end of airway and fix it in place with the suspension tape.

### Serum Albumin

Serum is obtained from clotted blood and differs from plasma in that it does not contain fibrinogen. Early administration of human serum will prevent the fall of blood pressure associated with decreased blood volume in shock. Once this fall in pressure has

occurred and is allowed to persist, irreversible tissue changes ensue and death will follow. Serum albumin is hypertonic. Dehydrated patients must receive added fluids intravenously or subcutaneously. The use of serum albumin should be regarded as an emergency measure; therefore, severe anemia, following burns, or excessive hemorrhage should, subsequently, be treated with whole blood as soon as possible.

The standard serum albumin package consists of 100 cc. of a 25-percent solution of human serum albumin (25 Grams of albumin) in a double-ended glass container having a small rubber stopper at each end, complete with airway, intravenous equipment, and suspension tape.

One unit (100 cc. of a 25-percent solution of albumin) may prevent shock in a wounded individual or delay its onset for many hours. Before such an individual is moved any great distance he should receive one unit.

### *Instructions for Use*

1. Apply alcohol or iodine to both rubber stoppers.
2. Holding container in the upright position, insert air filter needle through top rubber stopper.
3. Insert short needle of the intravenous set through the lower rubber stopper.
4. Attach intravenous needle to small observation tube.
5. Allow tubing to fill with albumin solution.
6. Insert needle into vein.
7. Suspend container approximately 3 feet above patient.
8. Except in severe shock, the rate of administration should not exceed 5 cc. per minute.

NOTE: Puncture in vein may be difficult in shock. If necessary cut down vein or use femoral vein (needle introduced at right angles to skin  $1\frac{1}{2}$  inches below midpoint of Poupart's ligament just medial to palpable pulsating femoral artery.)

CAUTION: In the presence of dehydration, albumin must be given with or followed by intravenous saline or dextrose and saline.

## **Plasma**

### *Dosage*

In estimating the dosage of plasma it is necessary to consider the extent and degree of the injury as well as the age and condition of the patient.

1. Patients exposed to obvious cause for shock but clinical symptoms not yet apparent: 250 to 500 cc.
2. Patients who give indication of early, moderate shock: 250 to 750 cc.

3. Patients in severe shock: 750 to 1,500 cc. (This is repeated as often as necessary.)

4. Extreme shock (usually long untreated): 1,500 to 3,000 cc. (The first 250 cc. to 500 cc. administered as rapidly as is possible. Repeated as often as necessary.)

5. Severe burn cases (whether in great shock or not): Give at least 1,500 cc. as shock is sure to develop and will otherwise overwhelm the patient before a sufficient amount of plasma can be given.

NOTE: A reasonable length of time between doses of plasma should be allowed in order to observe the patient's reactions. If the patient responds well it is sometimes unwise to give more plasma at that time.

FLUIDS: Many men in shock are dehydrated. Plasma and serum albumin tend to restore to normal the blood volume by drawing water from tissue spaces into the blood stream. Therefore, further tissue dehydration takes place, so that it is essential that fluids be given by mouth if the patient

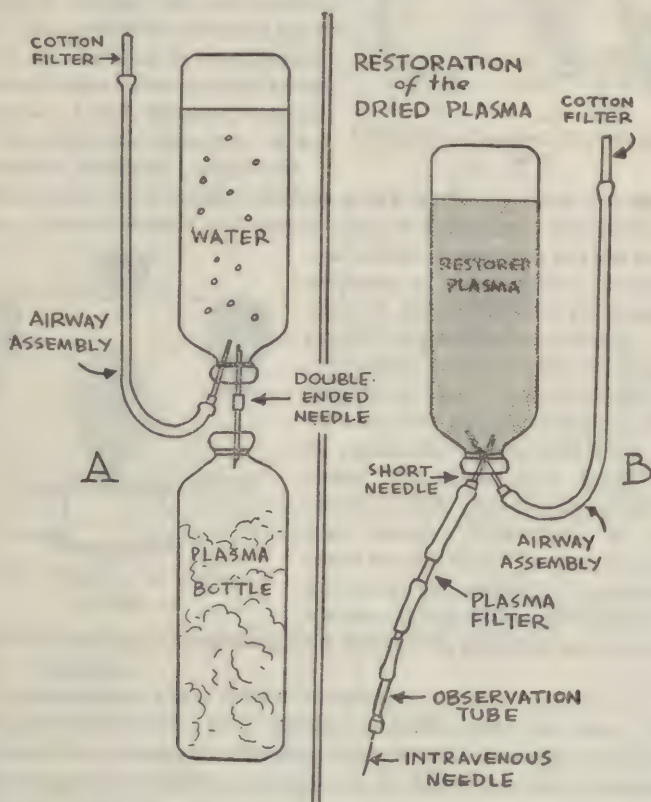


FIG. 11.—Diagram of plasma administration set-up.

is conscious or by vein if he is not. Water is retained better if salt is added. Physiological saline solution is also of great value when administered by mouth as well as intravenously. If none is available for oral use, salt tablets may be added to water in canteens. Fluids should be forced so that the patient will produce an output of 1,500 cc. of urine a day.

## DRESSINGS

A dressing or compress is the name given to any material used to cover or dress a wound. Gauze is the most common material used, although cotton wrapped in gauze is used in some instances. Never use absorbent cotton directly over a wound as it has a tendency to stick and is difficult to remove.

A pad put directly over a wound is called a compress. In ordinary emergency treatment a wound dressing consists of a compress with a bandage to secure it. A dressing may be either dry or wet, aseptic or antiseptic. An aseptic dressing is one which is sterile; i. e., one with no bacteria on it. An antiseptic dressing is one which, in addition to being sterile, contains some substance for killing bacteria. A wet dressing is generally an antiseptic dressing. A wet, antiseptic dressing generally is used for infected wounds, whereas a dry sterile dressing is used to cover a recent wound considered free of infection. The purpose

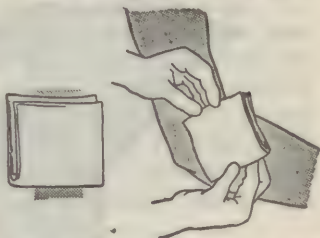


FIG. 12.—Compress for wound on arm.

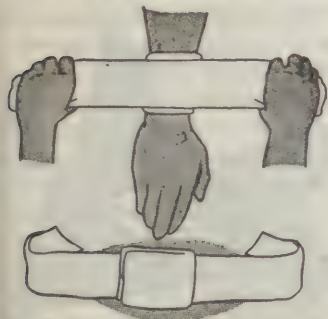


FIG. 13.—Compress for wound of the wrist.

of a wound dressing is to stop hemorrhage, to prevent the introduction of bacteria, and to prevent further injury to the wound.

In most first-aid kits the dressings have been manufactured in various sizes, and are sealed in sterile packages. When using a compress, the part that comes in contact with the wound must be kept sterile. Therefore, do not touch any part of the compress that will cover the wound. To prevent contamination, the sterile dressing

should be applied immediately and secured in position by adhesive or by a bandage.

In emergencies, when sterile compresses are not available, clean towels, handkerchiefs, or a similar material, may be used. Try to protect the wound by applying the cleanest dressing available. Several layers of a sterile bandage can be improvised for a dressing as shown in Fig. 15. Compresses and dressings are manufactured in various sizes. When using a sterile compress, choose one large

enough to cover the entire wound and to extend beyond its margin. If the compresses are too small they may be overlapped until the wound is covered.

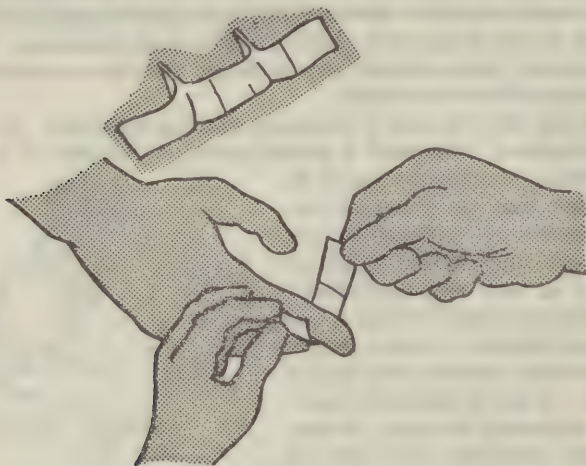


FIG. 14.—Adhesive strap compress.

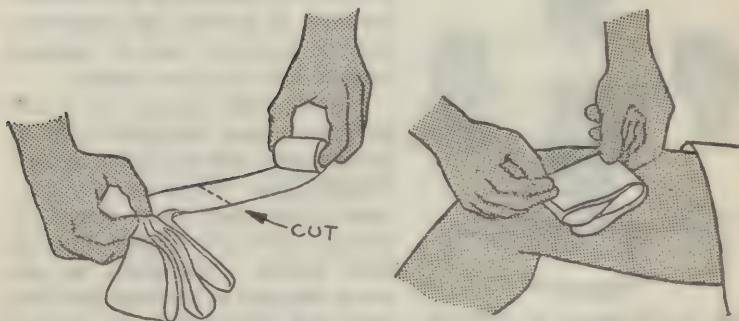


FIG. 15.—Improvised compress. Left drawing shows how a bandage is fanfolded and cut. Right drawing indicates a use of the compress.

## BANDAGING

The art, technic, and individual types of bandaging in its entirety, are not given here. The fundamentals are listed as a guide to hospital corpsmen, and only the most commonly used and practical methods of bandaging and splinting are illustrated.

Several of the popular individual types of bandaging found in many first-aid books have been purposely omitted. Recent literature points out that a number of these older methods are detrimental to the patient and actually do more harm than good. For example, the Velpeau bandage and the Sayre dressing have been omitted as several authors pointed out that the former does not reduce the deformity but tends to increase it, and the latter if efficiently applied is most unbearable for the patient. The Barton bandage, too, so popular in first-aid procedures for fracture of the jaw should not be used as it tends to increase the overlapping of bony fragments and push the tongue backward against the pharynx.

### *Materials and Technics*

A bandage is any material that is used to fixate a dressing, to secure a splint, to create pressure for the prevention of hemorrhage, or to support an injured part.

Neatness and accuracy in the technic of bandaging has always been a tradition among hospital corpsmen. To carry out this tradition and to master the technic, it is necessary to become familiar with the general rules of bandaging. The proper bandage, properly applied, can materially aid in the recovery of a patient. A carelessly or improperly applied bandage can cause discomfort to the patient or may impair his life. A neat bandage is an indication that the dressing covered by the bandage has been carefully applied. Efficient bandaging is an art and can be learned only after much practice.

### *Types of Bandages*

1. *Roller bandage*—Usually made of gauze, flannel, muslin, or some elastic material. It is the most practical bandage for general use, and usually comes in the width of 1 inch to 4 inches (Fig. 16).

2. *Triangular bandage*—As the name implies—triangular in shape. It is used in emergencies for slings and to fix dressings and splints. Unbleached muslin is generally used in making these bandages, although linen, wool, silk or

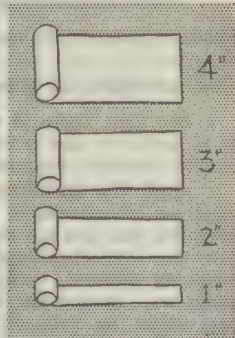


FIG. 16.—Bandage sizes.

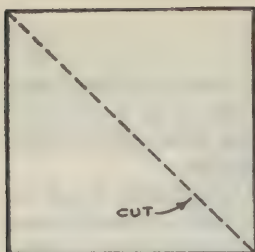


FIG. 17.—Triangular bandage.

cotton material can be used. It is made by cutting a piece of 40-inch square muslin diagonally into 2 pieces (Fig. 17).

3. *Cravat bandage*—A triangular bandage that has been folded over several times to make a narrow one.

4. *Many-tailed bandage*—Made by splitting (into as many strips as desired) a piece of muslin or other material, of the desired width, lengthwise within a few inches of the center of the strip. It is used for places on the body that are difficult to bandage, such as the nose and chin (Fig. 18). (When used on the abdomen it is called a "scultetus" bandage.)

5. *"T" bandage*—A horizontal strip of bandage with a verticle strip attached to its middle, the horizontal strip encircling the patient's waist and the verticle strip being passed between the legs and secured. It is used to hold dressings over the genital and rectal areas. The tail of the "T" may be split so that each end may pass around the scrotum (Fig. 19).

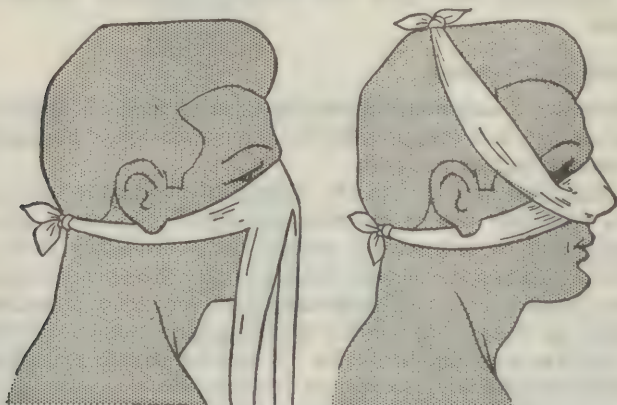


FIG. 18.—Many-tailed bandage and its application as a dressing for the nose.

### *General Rules for Bandaging*

1. See that there is sufficient bandage before starting the procedure. It is better to use more bandage than necessary than to have to use a smaller amount wrapped too tight.

2. Apply the initial turns securely, and when possible, begin around the smallest circumference of the part. Continue bandaging with uniform pressure, but not too tight. Excessive pressure (if left on too long) will interfere with circulation and the blood supply to the distal part will be seriously reduced, which may cause complications such as paralysis or gangrene. Remember, too, to allow for possible swelling. This swelling can often be reduced or prevented by elevation of the part after bandaging.

3. A common error in bandaging is that it is often applied too loose. Several hours after a bandage is applied, the gauze begins to stretch which may loosen the dressing and expose the wound, or allow bleeding to recur. Attention to this detail is important because if a pressure dressing has been applied for the control of hemorrhage, and bleeding starts while the patient is being moved, it may go unnoticed and seriously impair his life.

4. When bandaging a wound of the extremity, always start below it and work upward. Unless the fingers and toes are injured leave them exposed, in order that those parts can be continually observed for signs of impaired circulation.

5. Be sure that you secure the bandage in such a manner that it will not become loose. Do not tie the knot over any bony prominence or in such a manner where pressure of the knot will cause any discomfort.

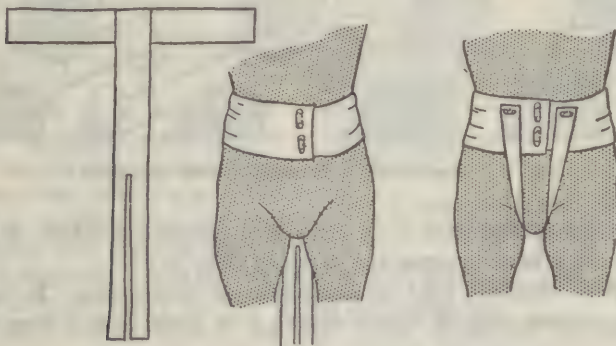


FIG. 19.—The "T" binder and its application.

Never use adhesive tape to secure the ends of a bandage that may become wet. Adhesive tape, when wet, comes off. Be safe—pin or tie the bandage.

6. Bandaging should be applied in such a manner that adjacent skin surfaces are not brought into contact. This causes excess perspiration with resultant irritation.

7. When using a roller bandage, each turn should overlap the preceding turn by one-third to one-half its width. The bandage must lie flat with no wrinkles or folds, and the skin should not be pinched between turns.

### **Precautions**

#### **1. Danger signs of too tight a bandage:**

- a. Skin distal to dressing becomes blue (cyanotic) and pale.
- b. Pain.
- c. Extremity becomes cold.
- d. Numbness and tingling of the extremity.

#### **2. Check the distal circulation frequently.**

#### **3. Watch for the recurrence of bleeding.**

4. If the patient complains of any of the above symptoms, look at the dressing immediately.

## Removal of Bandages

Bandage scissors are preferable when removing the bandage by cutting. Interference with the underlying dressing and the affected area should be carefully avoided. When cutting off bandages, cut away from the affected area.

## Use of Bandages

A *circular bandage* is used to cover a small area over a cylindrical part, such as the wrist. The bandage is applied at right angles to



FIG. 20.—Anchoring a bandage about the wrist.

the extremity and each turn directly overlaps the other, or may spread out a little to cover the dressing (Fig. 20).

A *spiral bandage* may be ascending or descending. It begins with a circular turn or two to secure it in place, and is then con-

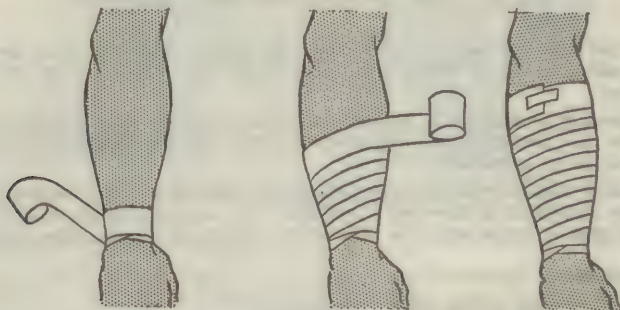


FIG. 21.—Spiral bandage for the forearm.

tinued upward or downward and in a spiral direction around the part being treated. Each turn parallels and overlaps the other from one-third to one-half its width (Fig. 21).

A *spiral reverse* is used to cover a part of the extremity that is cone shaped or one that tapers such as the forearm. When the

circular turn is made and it overlaps the other, the edge of the bandage toward the lower or smaller end of the extremity will be loose and expose the part. To overcome this and make the bandage lie flat, it is reversed 180° at each turn (Fig. 22).

The *figure of eight* is used in applying bandages to the neck, axilla, joints, hand and ankle. The bandage is anchored by several turns, and then looped to form a "figure of eight."

A *spica* is a "figure of eight" bandage that is useful for wounds near a ball and socket joint, where it is difficult to bandage, such as the shoulder and hip. A num-

ber of these turns are applied each a little higher or lower, so that each turn overlaps a portion of the preceding turn.

A *recurrent bandage* is one that, after anchoring the primary turns, is carried completely over a part to a point opposite its origin, and then reflected and brought back to the starting point where it is secured by one or more circular turns. It is used to cover the terminal points of the body such as the head, hand, fingers, or toes.

A *gauntlet*—This is a French word that refers to the old iron glove worn to defend the hand from wounds. In bandaging, it is the method used to cover the hand (demi-gauntlet) or to cover both the hand and fingers (full gauntlet).

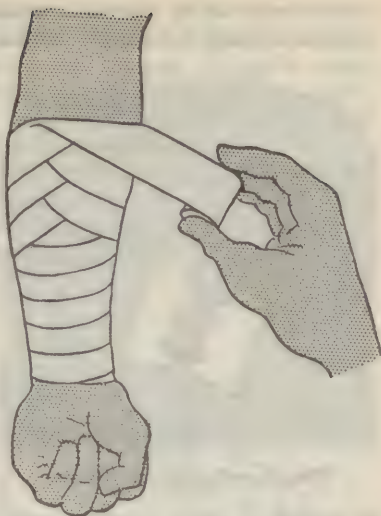


FIG. 22.—Spiral reverse bandage for the forearm.

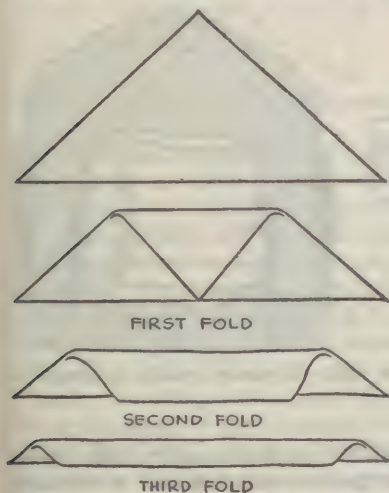


FIG. 23.—Cravat bandage.

A *cravat* is a narrow bandage usually made by folding and narrowing a triangle bandage (Fig. 23).

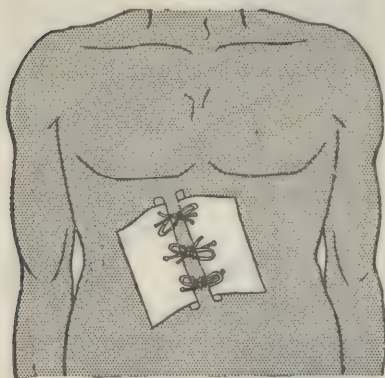


FIG. 24.—Abdominal straps.

*Abdominal straps* (Montgomery straps) are wide strips of adhesive to which narrow tapes or ribbons are attached. They are then applied in pairs opposite each other, and almost over the entire dressing. By tying or untying the tapes, the dressing can be changed without removing the adhesive (Fig. 24).

The *scultetus bandage* is a "Many tailed" bandage that is used to retain abdominal dressings requiring frequent changing. It is a large piece of muslin or other material with slits about 2 inches wide along its entire width and long enough to fit around the abdomen. Starting from below upward, the strips are folded over the dressing, each under the other, and the last anchor strip is secured with a pin. (Fig. 25.)

The *common swathe* is a wide piece of cloth that surrounds the torso and fastens with pins in the midline anteriorly. (Fig. 25.)

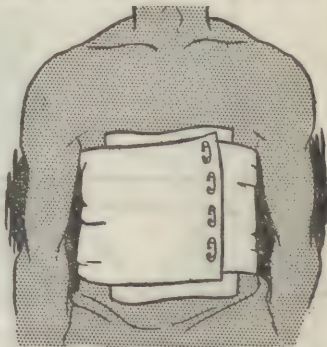
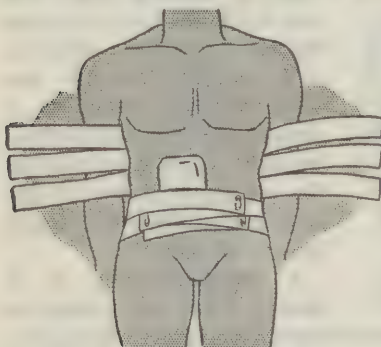


FIG. 25.—Left—scultetus bandage; right—common swathe bandage.

### *Triangle Bandage*

The triangular bandage, also known as the handkerchief bandage, is used for the temporary or permanent dressing of wounds, fractures, dislocations, and for slings. During the past war it was

used extensively to accomplish first aid on the battle line since it was easily applied and stayed on well. This bandage is usually preferred to a roller bandage for several reasons: It can be easily made from a sheet or similar material; it can be applied to the body with little disturbance to the patient; and it can be used folded as a cravat to make broad or narrow bandages.

*Triangular bandage for sling:* A sling is used to supply comfort and support to injuries of the upper extremity. Thus, it is used for all wounds and fractures of the hand, wrist, arm, forearm and elbow, or for a broken clavicle and broken ribs.

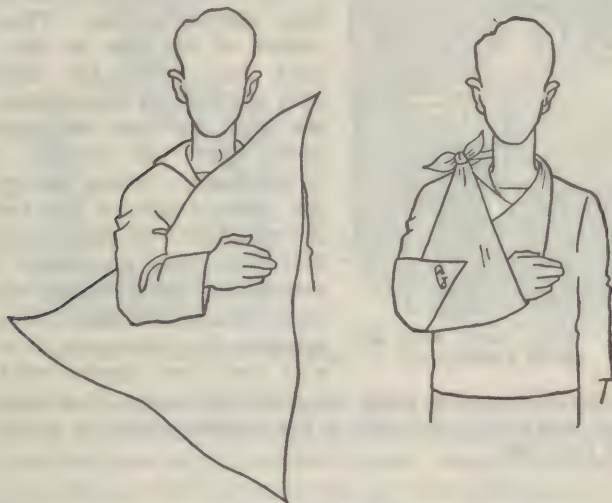


FIG. 26.—Sling made with a triangular bandage.

To make a sling, place one end of the triangular bandage over the shoulder on the uninjured side and let the bandage hang down over the chest with the point directed toward the injured side. Bend the injured arm at right angles so that the hand is about 4 inches above the level of the elbow and bring the point of the bandage behind the elbow on the injured side. Take hold of the lower end of the bandage and bring it upwards over the forearm and elbow and tie both ends just above the collarbone on the injured side.

Make necessary adjustments to ensure a comfortable sling, then bring the point of the bandage forward and secure it to the front of the sling with a safety pin. The end of the fingers should protrude from the dressing at all times so that the circulation in the fingers may be observed (Fig. 26).



FIG. 27.—Sling made with the tail of a shirt.

There are several other methods of improvising an arm sling such as pinning the sleeve of the shirt or coat to the clothing or by turning up the lower edge of a shirt or coat and pinning it in a similar manner (Fig. 27).

*Triangular bandage for the head:* Used to retain dressings on the forehead or scalp. Fold back the base of the bandage about 2 inches, thus making a hem. Place the middle of the base on the forehead just above the eyebrows with the hem on the outside. Let the point fall over the head and down over the occiput (back of the head). Bring the ends of the triangle around the back of the head above the ears, cross them over the point and carry them around to the forehead and tie them in a square knot. Hold the dressing firm with one hand and with the other, gently but firmly

pull down on the point until the dressing is snug, then bring the point up and tuck it over and in the bandage where it crosses the occiput (Fig. 28).

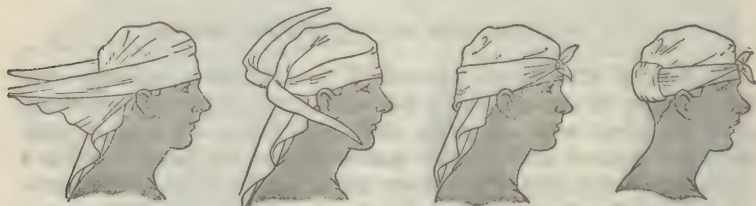


FIG. 28.—Triangular bandage for the head.

*Triangular bandage for chest or back:* Used to retain large dressings on the chest or back. For the chest drop the point of the triangle over the shoulder on the injured side, letting the base fall down over the injured area. The middle of the base should be directly below the shoulder. Bring the ends around the body to

the back and tie them in a square knot directly below the shoulder. If the base hangs too low below the wound, it may be shortened by folding it over several times before tying. This leaves one long end. Tie this long end to the point of the triangle lying over the shoulder, completing the procedure (Fig. 29). Reverse the procedure for a back bandage tying the ends over the chest.

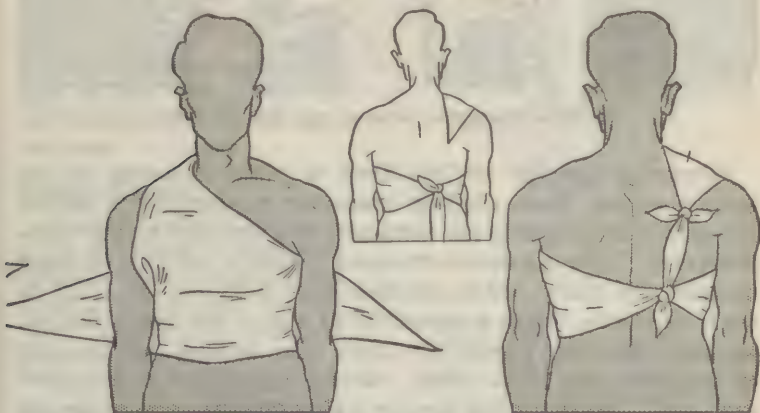


FIG. 29.—Triangular bandage for the chest or back.

*Triangular bandage for shoulder:* Used to hold dressing on the upper arm or shoulder, but two triangular bandages are necessary. Fold the first one into a narrow cravat. Place the base of the cravat on the top of the shoulder on the injured side and bring the ends across the back and chest respectively, continue under the opposite axilla and tie in front with a square knot. Before tying knot place a pad in the axilla on the uninjured side to prevent pressure by the narrow cravat. Turn up the base and make a hem of the second triangular bandage and apply it to the arm on the injured side. Carry the ends around behind the arm, cross and tie them in front. Support the dressings firmly with one hand and with the other, tuck the point of this triangle under and over the cravat on the shoulder and pull gently until the dressings are held snugly in place. Pin the point to secure it. If no pin is available, the point of the triangular bandage can be folded under the cravat several times before the cravat bandage is applied. Remember, do not tie the ends around the arm too tight. Check the distal circulation frequently.

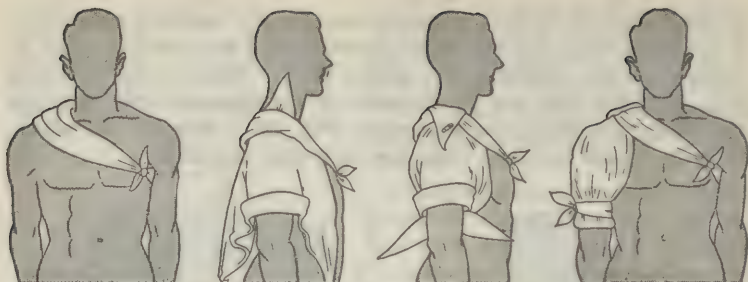


FIG. 30.—Triangular bandage for the shoulder.

*Triangular bandage for hip:* Used to retain dressings on the buttock or hip. Make the first triangular bandage into a narrow cravat and tie it around the abdomen, with the knot on the uninjured side. Take the second triangular bandage and tuck its point up under the cravat, letting the base hang down over the thigh on the injured side. Make a hem along its base to the height desired, and carry the ends around the thigh, cross in back and tie them on the outer side of the thigh. Hold the dressings in place and gently pull the point until they are well supported, then secure the point with a safety pin, or tuck under (Fig. 31).

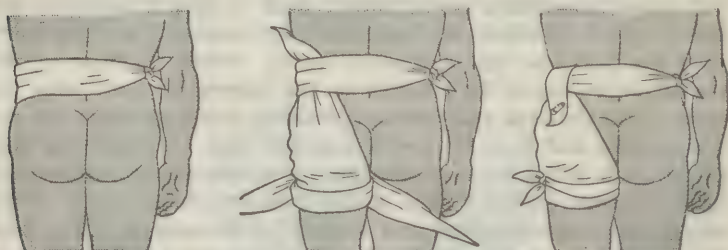


FIG. 31.—Triangular bandage for the hip.

*Triangle bandage for the hand:* Used to retain large dressings on the hand. After the dressings are applied place the base of the triangle well up on the palmar surface of the wrist. Carry the point over the ends of the fingers and back of the hand well up on the wrist. Fold the excess bandage at the sides of the hand in folds, cross the ends around the wrist and tie in a square knot in front.

***Triangle bandage for foot:***

Used to retain large dressings on the foot. After the dressings are applied, place the foot in the center of a triangular bandage and carry the point over the ends of the toes and over the upper side of the foot to the ankle. Fold in excess bandage at the side of the foot, cross the ends and tie in a square knot in front.

***Cravat Bandage***

To make a cravat bandage, bring the point of triangular bandage to the middle of the base, and continue to fold until the desired width is obtained (Fig. 23).

***Head:*** This bandage is very useful to control bleeding from wounds of the scalp or forehead. After placing the dressing over the wound,

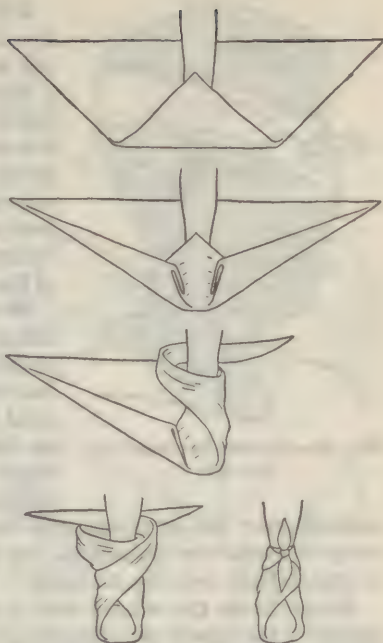


FIG. 32.—Triangular bandage for the hand or foot.

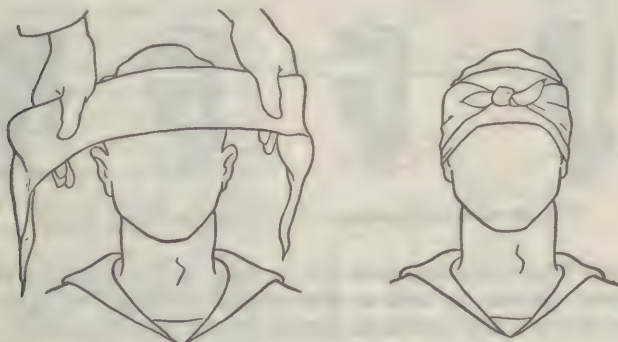


FIG. 33.—Cravat bandage for the head.

place the center of the cravat over the dressing and carry the ends around to the opposite side; cross them and continue to carry them around to the starting point and tie with a square knot (Fig. 33).



FIG. 34.—Cravat bandage for the eye.

**Eye:** After applying a dressing to the affected eye, place the center of the cravat over the dressing, and on a slant so that the lower end is inclined downward. Bring the lower end around under the ear of the injured side, and the other end over the ear on the opposite side. Cross the ends in back of the head, bring them forward and tie them over the center of the dressing (Fig. 34).

**Jaw, temple, cheek, or ear:** After the dressing is applied to the wound, place the center of the cravat over it, and carry one end over the top of the head and the other under the jaw and up the opposite side crossing them at right angles over the temple on the uninjured side. Continue one end

around over the forehead and the other around the back of the head to meet over the temple on the injured side. Tie ends with a square knot over the dressing.

**Neck:** Cover the wound with a compress and after placing the center of the cravat over the dressing, cross the ends on the opposite side of the neck and tie over the dressings (Fig. 36).

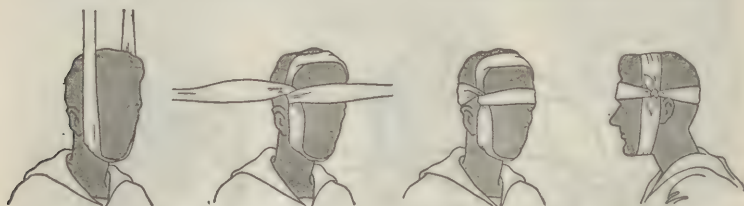


FIG. 35.—Cravat bandage for the temple, cheek or ear.

**Hand:** The cravat bandage can be used on the hand for several purposes. It can be used to stop profuse bleeding by having the patient grasp a firm pad large enough for his fingers to obtain sufficient pressure. Take a broad cravat and place the center of it over the back of the wrist and hand and wrap one end diagonally around the front of the hand. Now wrap the other end diagonally around the hand in the opposite direction cross and bring both ends around

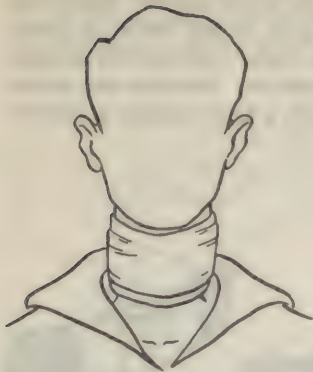


FIG. 36.—Cravat bandage for the neck.

to the front of the wrist, then to the back and tie (Fig. 37). It also can be used for securing a small dressing by using a narrow cravat. If the wound is on the palm, place the center of the bandage over the dressing, carry the ends around, crossing them at the back, then around forward over the wrist in front, and then around to the back of the wrist and tie. Reverse the procedure for a wound on the back of the hand. Support hand in a sling.

*Elbow or knee:* After applying the dressing to the knee or elbow, and if the injury or pain is not too severe, bend it to a right angle position before applying the bandage. Place the middle of a rather wide cravat over the point of the knee or elbow



FIG. 37.—Cravat bandage for the hand or foot.

and carry the ends around, crossing them in the hollow. Carry the upper end entirely around the upper part of the elbow or knee, bringing it back to the hollow, and the lower end entirely around the lower part, bringing it back to the hollow. See that the bandage is smooth and fits snug, then tie with a knot outside of hollow (Fig. 38).



FIG. 38.—Cravat bandage for the elbow and knee.

*Arm, forearm, leg or thigh:* The width of the cravat to use will depend upon the extent and area of the injury. For a small area, place the dressing over the wound and center the cravat bandage over the dressing. Bring the ends around in back, cross them, and tie over the dressing. For a small extremity it may be necessary to make several turns around in order to use all the bandage before tying. If the wound covers a larger area, hold one end of the band-

age above the dressing and wind the other end spirally downward across the dressing until it is secure, then upward and around again and tie a knot where both ends meet.

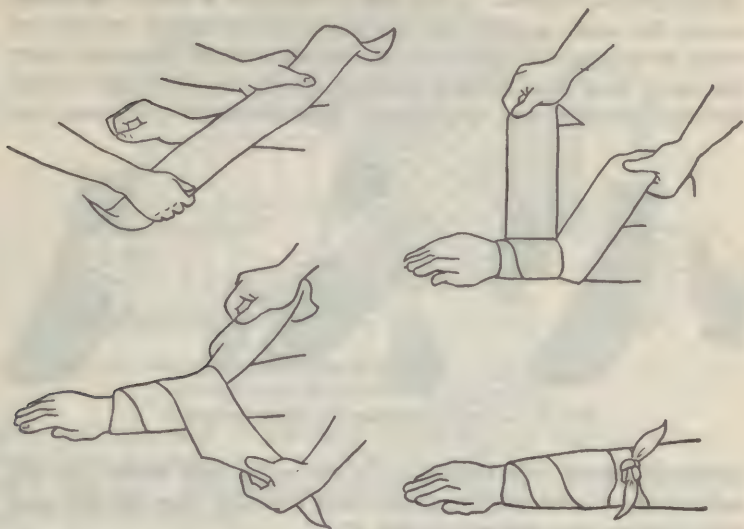


FIG. 39.—Cravat bandage for the arm, forearm, leg or thigh.

**Axilla (arm pit):** This cravat is to hold dressings in the axilla. It is similar to the bandage used to control bleeding from the axilla. Place the center of the bandage in the axilla over the dressing, and carry the ends up over the top of the shoulder and cross them. Continue across the back and the chest, respectively, to the oppo-

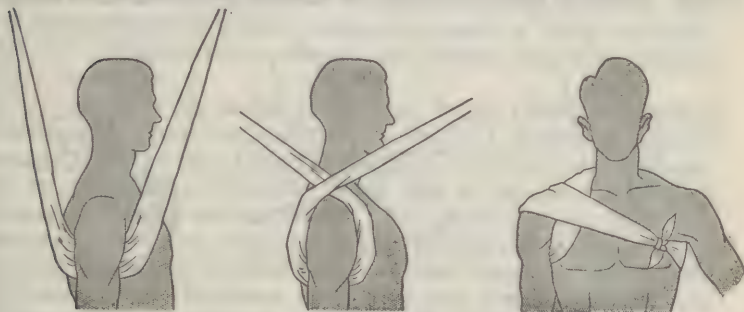


FIG. 40.—Cravat bandage for the axillary region.

site axilla and tie them. Do not tie too tight or the axillary artery will be compressed, adversely affecting the circulation of the arm.

*Sprained ankle:* Do not remove the shoe. Leaving it on will afford partial support. If the top of the shoe is above the ankle, loosen the laces to allow for swelling. Use a narrow cravat and begin by placing the middle of the bandage under the heel; carry the ends back and upward crossing above the heel and around forward crossing over the instep. Now continue downward and



FIG. 41.—Cravat bandage for sprained ankle.

backward again, this time close to the ankle and under the first turn, make a hitch and bring the ends forward, then around once more and tie over the instep (Fig. 41).

### *Individual Types of Bandages*

*Finger or toe:* Since injuries to the fingers are of frequent occurrence, a finger bandage often will be used. If the wound is minor, a small sterile dressing covered by a few circular turns of a 1-inch bandage will suffice. If the wound is more extensive, use a spiral bandage (Fig. 42). For wounds at the base of the finger use a 1-inch "figure of eight" bandage by making several circular turns

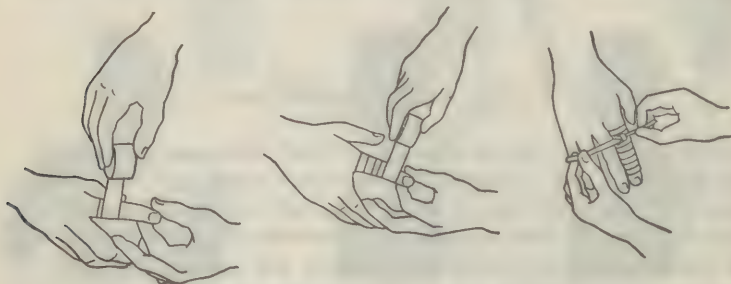


FIG. 42.—Roller bandage for the finger.

around the base to anchor the dressing and bandage and then carry it upward along the back of the hand to the wrist for several

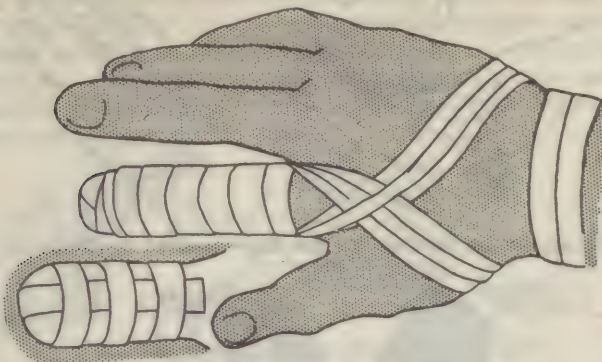


FIG. 43.—Roller bandage for finger. A simple bandage for a finger can be secured by adhesive.

turns and then back of the hand to the finger. Repeat this as many times as necessary to cover the dressing and immobilize the finger (Fig. 43). Adhesive may be used, if available, to reinforce and secure the dressing.

When covering the tip of the finger, use a 1-inch recurrent bandage. Make a few spiral turns at the base of the finger to anchor it. Hold the anchored end of the bandage with your left thumb and index finger and bring the bandage over the tip of the finger and back on the palm side. Hold this edge and return the bandage back over the tip of the finger to the starting point. Make as many recurrent turns as necessary to cover the dressing and protect the injury. Continue with a circular type of bandage to secure the edges. To prevent this type of dressing from slipping off the finger or thumb, continue to make a "figure of eight" (Fig. 43). If adhesive is available the dressing can be secured as shown in Fig. 44.

For injuries to the finger or toe that do not require emergency dressing and where the facilities are ample, a much more useful dressing is the use of a 1-inch bandage applied over a sterile dressing, to cover the part of the finger that is injured. A strip of adhesive is used to secure the end. For injuries of the finger tip, one may use a 3-inch sterile dressing. Fold the ends of the dressing over the finger tip and using a 1-inch bandage to complete the dressing with recurrent turns over and under the gauze and circular turns to secure it. Finish with a longitudinal adhesive strip held in place by circular strips.

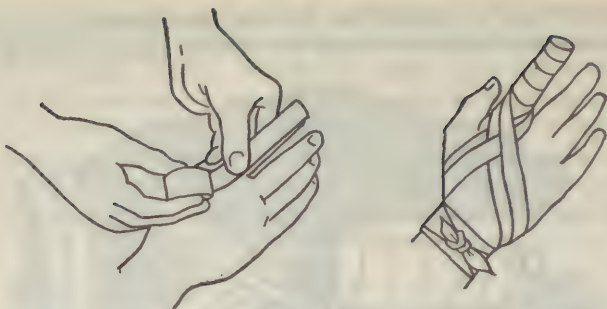


FIG. 44.—Roller bandage for the finger secured by “figure of eight.”



FIG. 45.—Roller bandage for the great toe.

*Hand and wrist:* For the hand and wrist a “figure of eight” bandage is ideal. Anchor the dressing whether it be on the hand or wrist with several turns of a 2- or 3-inch bandage. If on the hand, anchor the dressing with several turns and continue the bandage diagonally upward and around the wrist and back over the palm. Make as many turns as necessary to properly secure the dressing (Fig. 46).

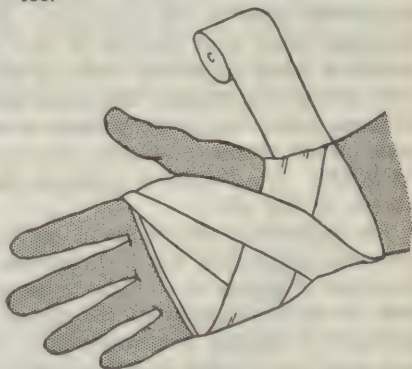


FIG. 46.—Roller bandage for the palm of the hand.

*Ankle and foot:* The “figure of eight” bandage is also used for dressings of the ankle as well as for supporting a sprain. While keeping the foot at a right angle, start a 3-inch bandage around

the instep for several turns to anchor it. Carry the bandage upward over the instep and around behind the ankle, forward and again across the instep and down under the arch, thus completing one "figure of eight." Continue the "figure of eight" turns overlapping one-third to one-half its width, with an occasional turn around the ankle, until the dressing is secure or until adequate support is obtained. If adhesive tape is available, it will add much to the ankle support (Fig. 47).



FIG. 47.—Roller bandage for ankle and foot.

*Arm:* Use a 2- or 3-inch spiral bandage, anchor it in the usual manner and tie, to make it secure. Due to the contour of the dressing, it may be necessary to use an occasional reverse to keep the bandage flat and even.

*Forearm, leg, and thigh:* The spiral reverse bandage must be used to cover wounds on these parts; only such a bandage can keep the dressing flat and even. (See p. 27.) Make two or three circular turns around the lower or smaller part of the limb to anchor bandage and start upward going around and around overlapping about one-third to one-half the width of the previous turn, and continue as long as each turn lies flat. When the edge of a turn is loose it is then necessary to use the reverse lap. Continue the spiral, making reverse laps when necessary, and secure the end when completed (Fig. 48). Note that it is not necessary to "reverse" each turn as is described in most text books.

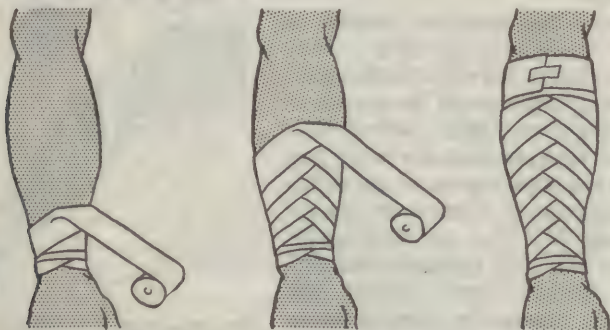


FIG. 48.—Roller bandage for forearm or leg.

**Elbow:** A spica or "figure of eight" type of bandage is used around the elbow joint to retain dressings over wounds in the region of the elbow and to allow a certain amount of movement. Flex the patient's forearm slightly if you can do so without causing him

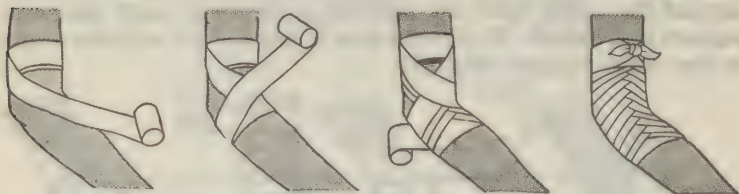


FIG. 49.—Roller bandage for the elbow joint.

too much pain, and anchor a 2- or 3-inch bandage above the elbow with two circular turns. Carry it diagonally downward across the hollow of the elbow, and encircle the forearm below the elbow with a circular turn. Continue the bandage diagonally upward across the hollow of the elbow to where you started. Make another circular turn around the upper arm, carry it downward, repeating the "figure of eight" procedure and gradually ascend the arm. Overlap each previous turn about two-thirds the width of the bandage. Secure the bandage with 2 circular turns above the elbow and tie (Fig. 49). To secure dressings on the tip of the elbow, reverse the procedure and cross the bandage in the back.

**Knee:** The spica or "figure of eight" bandage of the knee is similar to that of the elbow and is used to retain dressings in the region of the knee joint. Make two circular anchor turns around the thigh just above the knee and carry the bandage diagonally downward across the knee cap (Fig. 50), and encircle the leg below the knee with another circular turn. Carry the bandage diagonally upward again crossing the knee cap to the basic

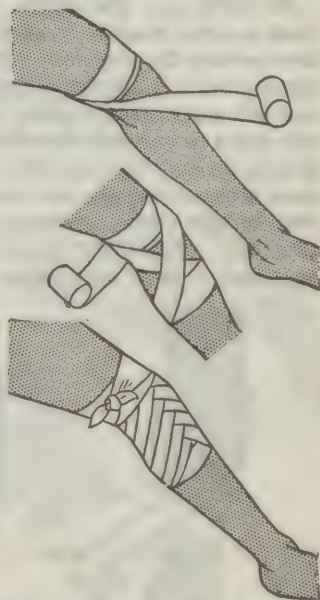


FIG. 50.—Roller bandage for the knee joint.

anchor turn. Make another circular turn, repeat the "figure of eight" procedure, overlapping each previous turn about two-thirds the width of the bandage, and gradually ascend the knee. Secure the bandage with several circular turns above the knee and tie. To secure dressings in the hollow of the knee reverse the procedure and cross the bandage in the back.

*Heel:* The heel is one of the most difficult parts of the body to bandage. Place the free end of the bandage on the outer part of the ankle and bring the bandage under the foot (Fig. 51) and up.



FIG. 51.—Roller bandage for the heel.

Then carry the bandage over the instep, around the heel and back over the instep to the starting point. Overlap the lower border of the first loop around the heel and then repeat, the turn overlapping the upper border of the loop around the heel. Continue these turns until the desired number of turns is obtained and secure with several turns around the lower leg.

*Hand and fingers:* A gauntlet bandage is used to cover the entire hand and each finger separately in order to provide motion of each

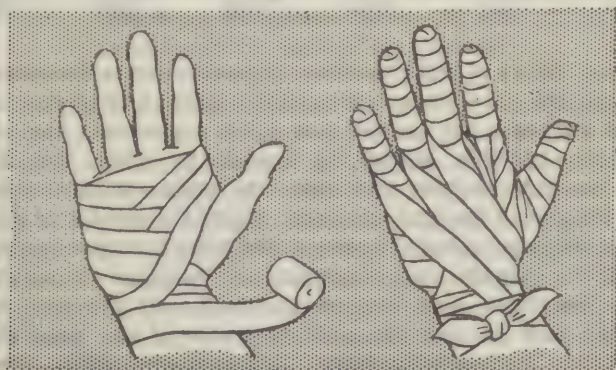


FIG. 52.—Roller bandage for hand and fingers (gauntlet).

part. Use a 2-inch bandage and anchor at wrist with 2 circular turns, and cover the hand with a "figure of eight" bandage. This is called a "demi-gauntlet". For a full gauntlet cover each finger with a spiral turn. Use a 1-inch bandage and secure it around the wrist. Carry the bandage around the back of the hand to the little finger and with another single turn to the tip. Cover the finger with spiral turns, then back across the hand and around the wrist. Continue the same procedure until the necessary number of fingers are covered. Secure by tying (Fig. 52).

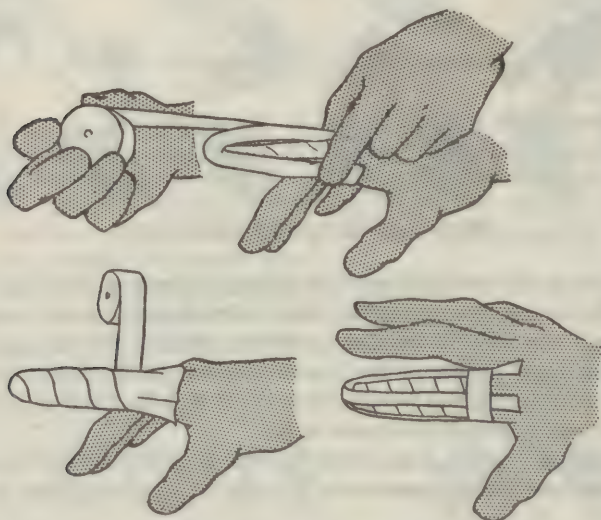


FIG. 53.—Roller bandage for the finger.

*Eye:* A "figure of eight" bandage is used to secure dressings covering the eye. If one eye is covered it is called a monocular bandage, if both eyes are covered it is called a binocular one. For a monocular bandage, anchor the bandage by taking two circular turns, around the head just above the eyebrows starting in the direction toward the uninjured eye. Carry the third turn over the back of the head, below the occiput and bring it forward under the ear of the injured side. Continue the bandage diagonally up across the cheek, over the eye and bridge of the nose to the forehead and up over the unaffected side of the head slightly higher than the anchoring turns. Repeat the procedure, alternat-

ing high on one side of the head when it is low on the other, until the necessary turns are made. Such a dressing is more comfortable to the patient if a pad is placed over and behind the ear before bandaging (Figs. 54 and 55).

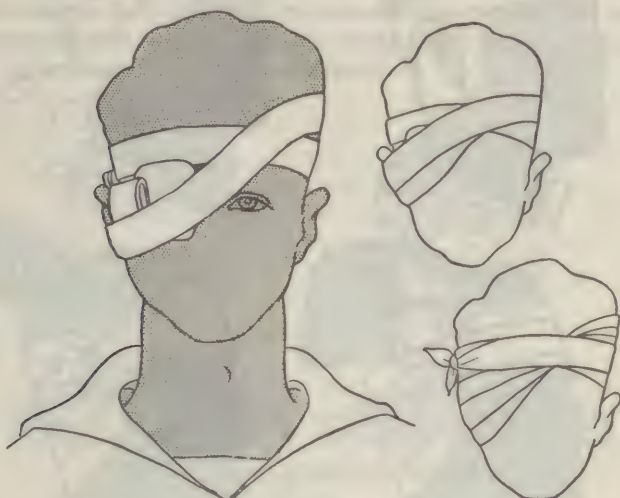


FIG. 54.—Roller bandage for the eye.



FIG. 55.—Roller bandage for both eyes.

*Ear:* For an ear or mastoid dressing, start with 2 circular turns around the head. Split a gauze square and place around the ear with a second dressing covering the ear (Fig. 56). Lay a piece of bandage about 6 inches long on the head so that it hangs down on the eye on the affected side. Wind the bandage alternately high and low on opposite sides similar to the eye bandage, but do not cover the eye. Tie both ends of the piece of bandage above and below the eye, or push a piece of bandage under the turns with a tongue blade, and tie. Secure with adhesive tape. This prevents the bandage from slipping down over the eye.

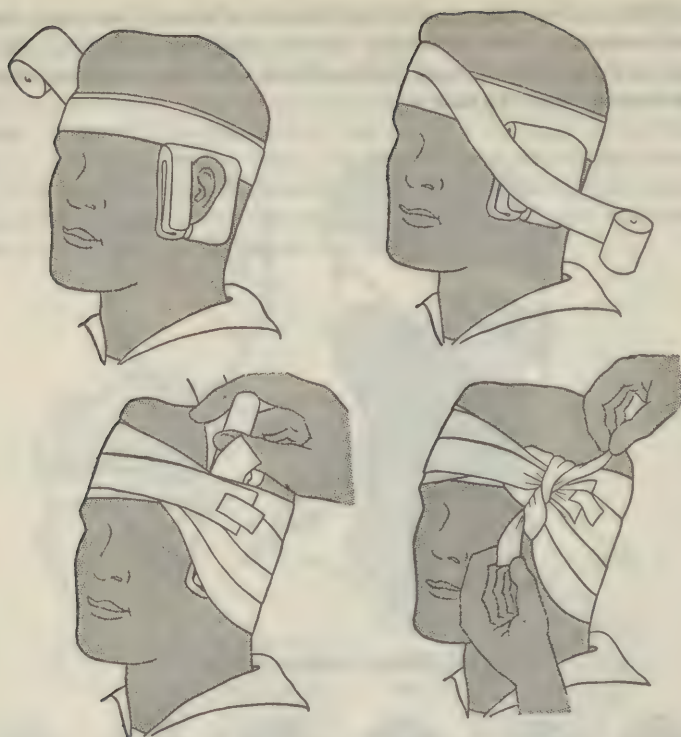


FIG. 56.—Roller bandage for the ear.

**Nose and chin:** The "four tailed bandage" can be used to dress these parts. Take a piece of bandage about 3 feet long and 3 or 4 inches wide, and split it down the middle, leaving as large an area as necessary to cover the part. Place the dressing over the wound, and place the center part of the bandage over the dressing. Cross the tails and bring the upper pair of tails downward and the lower pair upward, and tie them securely on the back of the head.

**Neck:** For simple wounds on the neck a circular or spiral reverse bandage is all that is necessary. For larger wounds, or wounds high on the neck in the scalp line, or wounds low on the side and in back, the "figure of eight" bandage is necessary. To secure a high dressing on the back of the neck start with several turns of a 2- or 3-inch bandage around the forehead and bring it down across the back of the neck and take a turn around it, continuing diagonally back across the nape of the neck and around across the fore-

head (Fig. 57). Make the number of turns necessary to hold the dressing and secure with adhesive.

For a low dressing on the neck, or on the anterior or posterior part of the chest near the shoulder, anchor a 3-inch bandage with several turns around the neck, and bring it across the wound. Place a pad in the axilla and bring the bandage around the pad up and back around the opposite side of the neck. Make the number of turns necessary to hold the dressing.



FIG. 57.—Roller bandage for the neck.

*Head:* The recurrent bandage is frequently used to retain large dressings of the scalp. This procedure requires the aid of an assistant. Use a 2-inch bandage. Make two circular anchor turns around the head just above the eyebrows and below the occipital protuberance in back. On the third turn around when the bandage reaches the back of the head, make a recurrent turn upwards at right angles in such a manner that the bandage is directed over the top of the head and down to the center of the forehead. Have the assistant or the patient hold the end of

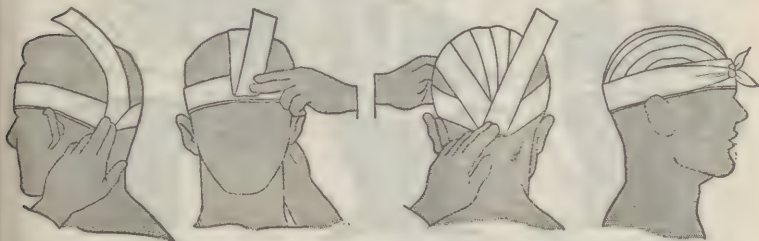


FIG. 58.—Roller bandage for the head (recurrent).

the recurrent turn over the lower border of the circular turn on the forehead. Reverse the procedure making another recurrent turn upwards and over to the back of the head, overlapping one side of the preceding layer by one half its width. Hold this recurrent turn with the first. Continue the same procedure, making recurrent turns, alternating on each side and overlapping each turn by one half its width, until the bandage covers the anchor turns above the ears. Secure the ends by several circular turns around the head (Fig. 58). Reinforce the bandage with adhesive.

The double recurrent bandage of the head needs no assistant for its application. Tie the ends of two 2-inch roller bandages together, and place the knot under the occiput. One bandage will be used only to make the recurrent turns (bandage No. 1) and the other (bandage No. 2) will be used only to encircle the head and anchor each turn. Bring both rolls forward above the ears, and cross them at the center of the forehead. Carry roll No. 1 upwards over the head down to the nape of the neck, and roll No. 2 around the head and over the end of No. 1, thus anchoring it. Carry No. 1 upward and forward again, overlapping the preceding turn by one-half its width, and down to the center of the forehead. Bandage No. 2 is continued around encircling and anchoring the end of bandage No. 1. Repeat the procedure, alternating the

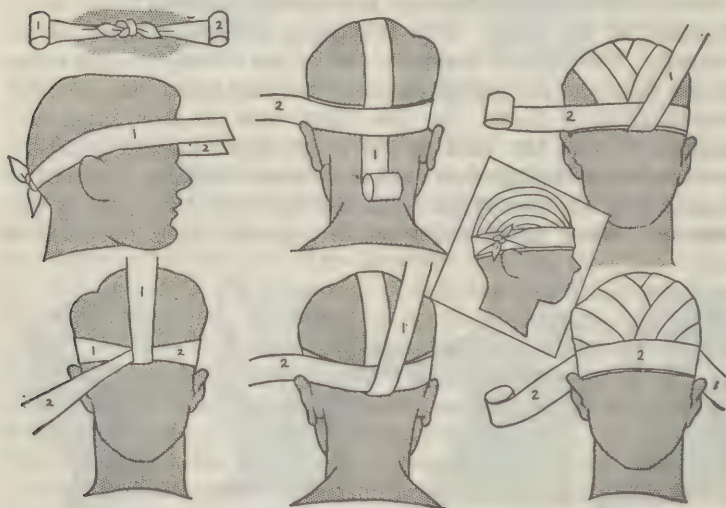


FIG. 59.—Roller bandage for the head (double recurrent).

recurrent turns on each side, and overlapping the previous one by one-half the width. When the recurrent turns reach the ears, secure with several circular turns and tie (Fig. 59).

A handkerchief type of bandage may also be used for securing dressings on the head. Use a square handkerchief or a piece of gauze sufficiently large enough to cover the entire head. Pass a 1-inch adhesive strip around the head just above the eyebrows, ears and below the occipital protuberance. Fold back the loose corners under another layer of adhesive or trim the edges with scissors.

*Jaw:* Before applying a bandage for a fractured jaw, pull the lower jaw forward to prevent overlapping of the bony

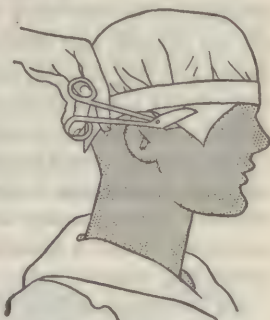


FIG. 60.—Handkerchief bandage for the head.

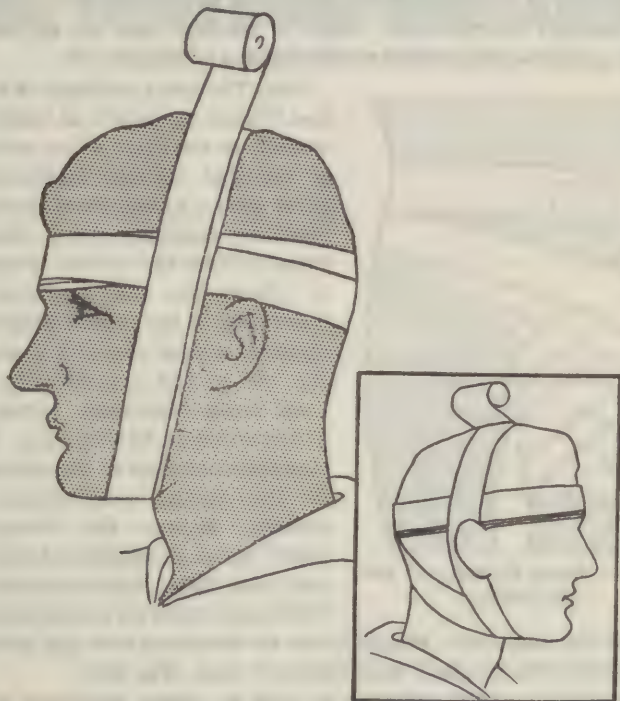


FIG. 61.—Roller bandage for the jaw.

fragments. Take a 2-inch bandage and place the end over the temple on the injured side, and anchor with two turns around the head, above the ears proceeding from the front to the back. At the completion of the third turn, continue the bandage above the ear on the injured side down back over the occiput and neck, forward under the jaw and up the opposite side of the face in front of the ear. Carry the bandage over the top of the head, down back of the opposite ear, under the jaw and back to the temple, continuing for several turns, overlapping in the area over the jaw. Complete the bandage by making a reverse over either temple and carrying two circular turns around the head (Fig. 61). Secure with a tie or adhesive. Such a bandage may also be used for wounds over the cheek and temple.

Do not make a turn of the bandage around the chin and across the back of the neck. (The principle of the Barton bandage). This turn puts pressure on the fracture and tends to increase the overlapping of bony fragments as well as to push the tongue backward against the pharynx. Such a bandage used on an unconscious patient could result in suffocation and death.

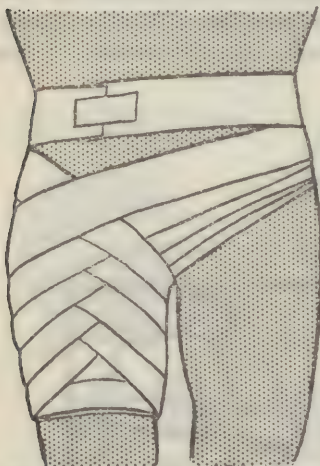


FIG. 62.—Roller bandage for the hip (spica).

*Hip:* The spica bandage (a modified "figure of eight") is useful for wounds of the groin when pressure is required to stop hemorrhage. Start with a 3-inch bandage at the groin by making several circular turns around the crotch to anchor it. Carry the bandage from the inner side of the crotch diagonally upward, across the groin, around the hip to the opposite hip, and then down diagonally across the abdomen again to the groin. Continue the bandage to the outer side of the thigh, and around the crotch. Repeat the "figure of eight" turns, overlapping the bandage each time, about one-half its width and make an occasional turn

around the abdomen. Pressure can be increased over the groin by reinforcing the bandage with adhesive tape (Fig. 62).

*Shoulder:* A spica bandage is used to retain dressings of the shoulder and axilla. Beginning from the inside out, anchor a

3-inch bandage with two circular turns around the upper part of the arm on the injured side, and make spiral reverses up the arm to the border of the axilla. Place a gauze pad in each armpit and carry the bandage across the back under the opposite axilla. Continue the bandage around across the chest to the top of the spiral reverse bandage around the arm. Take a complete turn around the arm under the axilla and carry the bandage once again around the back, under the opposite axilla, over the chest to the starting point. Make another turn around the arm, this time a little higher. Always overlap the preceding turn by one-half its width, gradually rising higher on the chest until the injured shoulder is covered (Fig. 63).



FIG. 63.—Roller bandage for the shoulder (spica).

## NOTES

## SPLINTS

Broken bones (fractures) can cause total disability or death. On the other hand they can often be repaired so that the patient completely recovers from his injury. A great deal depends upon the treatment he received *before being moved*. This treatment usually requires the use of splints. Fixing the fragments of a broken bone prevents the jagged ends of the bone from tearing blood vessels and nerves. In simple fractures proper application of a splint will prevent the bone piercing the skin and thus producing a compound fracture. If the fracture is compound, splinting will prevent further injury to the wound and the introduction of more

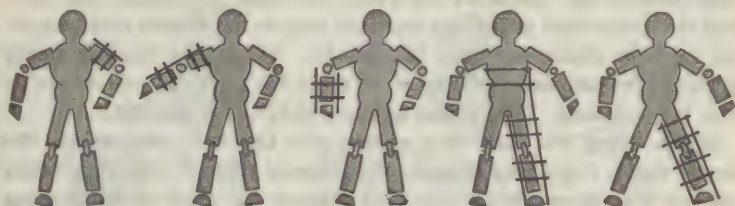


FIG. 64.—Diagrammatic application of splints for various fractures of the extremities.

infection. Proper splinting greatly relieves the pain of a fracture and will reduce and actually prevent shock. All fractures should be splinted "where they lie" before movement. Splinting, like bandaging, requires constant practice and attention to detail.

### Fixed Traction Splints

Fixed traction as a first-aid procedure for fractures of the thigh and leg is the most satisfactory of any procedure. The earlier the application, the sooner the patient's pain and shock will be lessened. The principle of fixed traction is to immobilize the bony fragments and prevent further damage to the surrounding tissues.

The Thomas splint for such fractures is the most efficient for traction splinting and transportation. The early type of Thomas splint had a full ring and was difficult to apply. The new modification, is a hinged half ring, instead of the full ring, which makes its application easier on the patient and less difficult for the first aider. If available, this splint should be used on all fractures of the lower extremity, simple or compound, except those below the ankle. It can be used too, on all extensive flesh wounds of the leg or thigh, when movement of the extremity causes severe pain.

### **Method of Application**

Before attempting to apply a splint keep the patient warm and treat him for shock. (See "General Treatment of Fractures" (p. 60). Do not remove his shoe as it will be used to anchor the traction bands. If cotton or padding is available, it is best to pad the ring to make it more comfortable to the patient before it is applied. The padding is held on the ring by a circular 3-inch bandage.

Have the assistant take a firm hold of the foot on the injured side with one hand on the heel and the other over the instep and exert a slow, steady pull (traction), keeping the foot at right angles and pointed up. He must not relax this pull. The next step is to pad the ankle and apply the traction bands. A simple and practical knot is shown in Figs. 65 and 66. While the knot is being applied, the assistant will have to shift his hold, but he is not to lose the traction. The splint is now ready to be applied.

When using the half-ring splint, slip the half ring under the upper thigh from the outside, the shorter part of the ring being toward the inner side of the leg. Adjust the ring so it fits snug

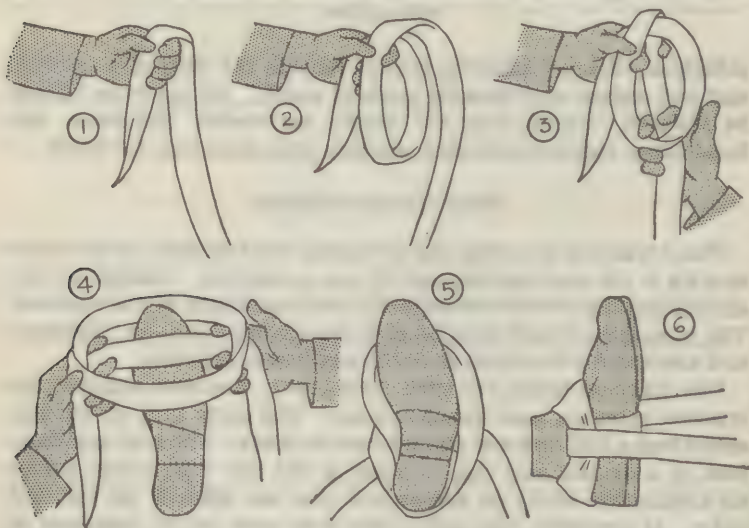


FIG. 65.—Successive steps in the application of a loop around the foot before applying traction.

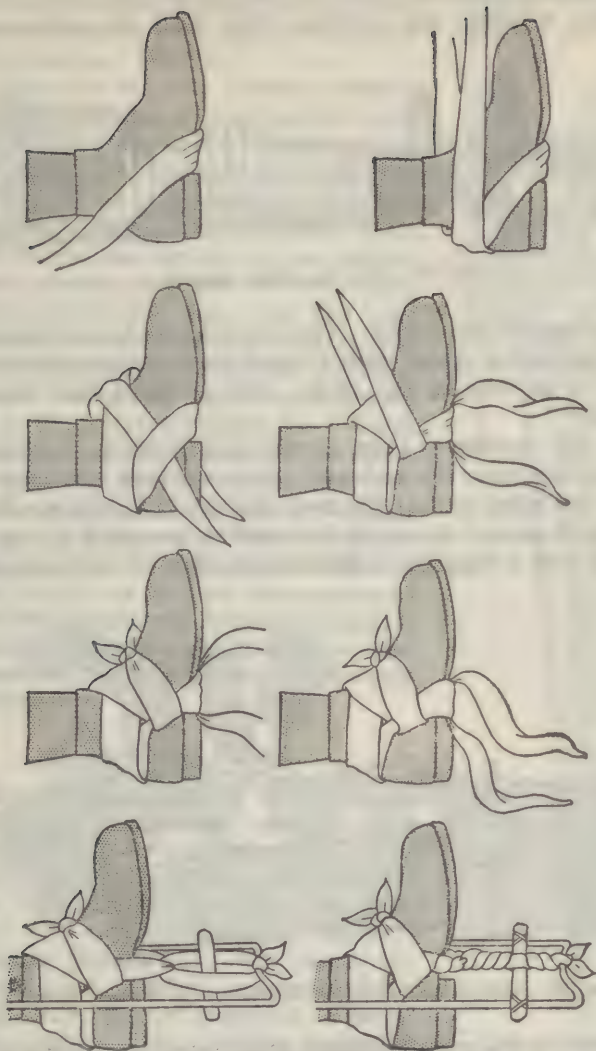


FIG. 66.—Construction of a "Spanish windlass" to provide traction in a Thomas splint.

against the buttock (if the patient is unconscious see that it does not press against the scrotum), and buckle the strap, but not too tight. Have the assistant push his knee against the splint, at the same time he keeps the traction. This holds the splint firmly

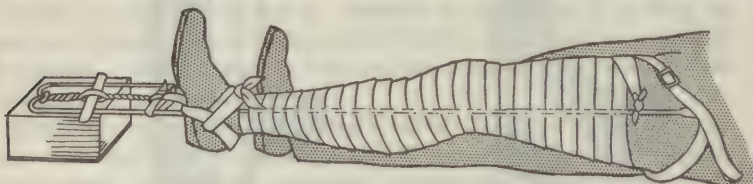


FIG. 67.—Thomas splint applied.

in place against the crotch. The traction bands are then tied to the end of the splint, with a small stick between the bands, twisting it to take up the slack. This is called the "Spanish Windless."

When the traction is tight enough to support the leg, anchor the stick, and have the assistant release his hold, but have him support the splint so that the heel does not touch the ground or deck. Next support the leg in the splint by wrapping the leg and side bars with a bandage as illustrated in Fig. 67. If no bandage

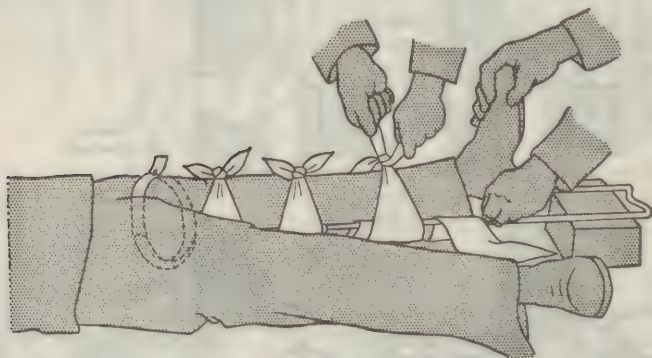


FIG. 68.—Initial steps in the application of a Thomas splint.

is available use five cravat bandages, muslin strips, or other material spaced up the splint. When cravats are used, place the center of the cravat between the leg and the bars, bring both ends down under the splint, cross them and carry them up on the outside of

the bars, where they are tied over the leg. Always keep the heel from touching anything. Either support the end of the splint on some object, or tie it to some object above. (Fig. 68.)

When the full-ring Thomas splint is used, proceed in a similar manner until the traction bands are applied around the ankle. The assistant then grabs the traction bands and gently transfers the traction to them using one hand. Place the ring around the foot of the patient. The assistant then uses his free hand, places it thru the ring, grabs the loose ends of the bands, transfers the traction to this hand while he lets go of the other.

The ring is then slipped over the leg up to the crotch, adjusted, the traction bands tied, and the procedure carried on as previously described.

The arm may be splinted in a similar manner. Such arm splints are usually hinged (Murray-Jones modification) at the ring to let the arm hang down at the side. **REMEMBER, AFTER THE SPLINT IS APPLIED, TO CHECK THE FINGERS OR TOES FREQUENTLY FOR EVIDENCE OF IMPAIRED CIRCULATION.**

### Improvised Splints

In an emergency, if fixed-traction splints are not available, splints may be improvised from materials found near the scene of the accident. Splints which are used solely to immobilize the fracture are called "coaptation splints." Suitable materials for such splints are boards, oars, paddles, boat hooks, light spars, guns, bayonet scabbards, or heavy wire mesh. Soft, flexible materials such as pillows, blankets, coats, cardboard, or folded newspapers make excellent splints for fractures of the lower arm or lower leg if properly



FIG. 69.—Cutaway view of leg bones fractures, showing how traction prevents grating.

applied. Boxboard splints are also used and are illustrated on p. 77. An improvised splint must be:

1. Rigid enough to keep the broken bone from moving or bending.
2. Long enough to extend well beyond the joints above and below the broken bone, and as wide as the extremity.
3. Reasonably light in weight.
4. Padded with soft materials such as cotton, gauze, cloth, or oakum (old rope untwisted and pulled into loose hemp).



FIG. 70.—Thomas splint.

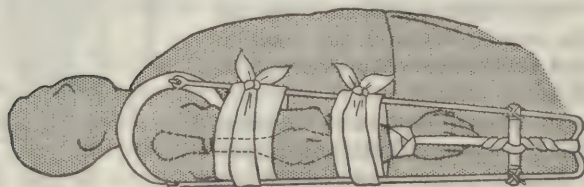


FIG. 71.—Thomas splint applied for fracture of the humerus. It is dangerous to use traction on the wrist unless you constantly watch the circulation in the hand and fingers.

## FRACTURES

A *fracture* is a broken bone. It may be partial or complete. Tissues near the site of a fracture are injured also. If in doubt as to whether or not a bone is broken, always treat it as a fracture.

### General Classifications

1. *Simple fracture*: The bone is broken but the surrounding tissues and skin are unbroken.

2. *Compound fracture*: The bone is broken and there is an open wound in the soft tissues leading from the skin surface to the region of the fracture.

3. A *Greenstick fracture* occurs when a bone shaft is bent and cracked, but not completely broken through.

4. A *Comminuted fracture* occurs when the bone is crushed, splintered, or broken into a number of fragments.

5. An *Impacted fracture* is one in which a fragment of bone is forcibly driven into another and remains more or less fixed in that position.

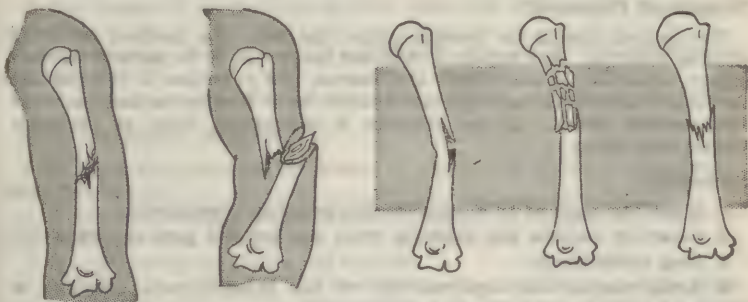


FIG. 72.—Types of fractures: Simple, compound, greenstick, comminuted, and impacted from left to right.

The terms single, double, or multiple refer to the number of breaks occurring in a bone.

The terms recent, old, united, or nonunited refer to the time of the injury and the degree of repair that has taken place.

An x-ray examination is ordinarily the only means of making an accurate diagnosis, especially in head injuries, but the symptoms of pain, loss of function, and deformity are easily recognized by the hospital corpsman and enable him to determine the proper method of first-aid treatment and evacuation from the field.

### General Instructions

1. Be gentle. Give morphine (except in skull cases).
2. Complete examination without producing further injury.

3. Do not try to produce crepitus as more harm will be done.
4. Unless circumstances make it impossible the fracture should always be splinted before the patient is moved. "Splint them where they lie."
5. Make the patient comfortable with sufficient blankets and by supporting the head, except in case of shock, when the head should be lowered or in case of fracture of any portion of the spine.
6. Rough manipulation is not only painful but tends to produce shock and further injures the part.
7. When a bone is broken it should be supported to prevent more soft tissue injury and shock.

### ***General Symptoms***

1. Pain and loss of function, or power to move part.
2. Unnatural position, deformity, or shortening.
3. Movement where there should be none.
4. Grating (crepitus) of the broken ends of bone can be felt and heard.
5. History of violence, such as a blow or a fall. Patient may have heard bone crack or felt it give way.
6. Swelling and discoloration.

### ***Treatment (General)***

The patient should be brought under the care of a medical officer as soon as possible. The object of first-aid treatment is to prevent further injury, especially to the vessels and nerves, and puncture of the skin by the sharp knife-like edges of the broken bone fragments and to treat and prevent shock. If the fracture is compound, treat as an open wound and splint.

### ***Procedure:***

1. Place the patient in a comfortable position (recumbent).
  2. Carefully remove the clothing from the injured part or cut it off.
  3. Stop hemorrhage.
  4. Avoid mechanical manipulation of the injured part. Healing is delayed by the trauma due to manipulation.
  5. Treat for shock. Give morphine for pain ( $\frac{1}{4}$  to  $\frac{1}{2}$  grain). Do not treat fracture at once if time can be permitted to overcome shock and pain by morphine first. Relief is noted usually about 20 minutes after the syrette has been given.
  6. Immobilize the fracture by applying splints.
  7. After this is completed, the patient is ready for transportation.
- ALWAYS, IF IN DOUBT OF A FRACTURE, TREAT AS A FRACTURE.**

## ***First-Aid Treatment of Various Fractures***

### ***Skull***

#### ***Fracture of the Base:***

The principle dangers in this type of fracture are rupture of meningeal arteries and intracranial hemorrhage.

These fractures may be simple or compound. Infection may take place from the nose or ears, owing to the fact that the mucous membrane lining of these structures is often broken. Depressed

fracture may be present. This type of fracture has greatest mortality rate due to intracranial hemorrhage and direct injury to the cranial nerves and brain tissues.

#### *Fractures of the Vault:*

The danger lies in the tearing of the brain tissue itself by the fragments of bone and in the tearing of blood vessel walls resulting in hemorrhage with brain compression.

#### *Depressed Fracture:*

In this case the skull has been "caved in" causing the following pressure symptoms:

1. Patient may be conscious, or unconsciousness may follow a brief period of consciousness.
2. Severe headache, vertigo (dizziness and fainting).
3. Unequal or irregular pupils; failure of vision.
4. Facial paralysis.
5. Slow pulse and respiration.
6. Paralysis of the arms or legs.
7. Restlessness and disorientation.
8. The escape of cerebral-spinal fluid from the nose or ears sometimes occurs.
9. Hemorrhage from the brain cavity into the ear or into the eyelids and nose.
10. Depression in the skull or other deformity that can be seen or felt.

The treatment consists of:

1. Keeping the patient lying down. Restrain him gently if necessary.
- KEEP HIM QUIET.**
2. Avoid stimulants. Do not give morphine. It is contraindicated as it masks symptoms.
  3. If available apply an ice bag to head.
  4. Place sterile cotton in the ears if bleeding, or in the nose if spinal fluid is blowing out.
  5. If there is a laceration of the scalp treat the wound, use chemotherapy in the form of sulfanilamide. (Never use sulfathiazole.)
  6. Prepare for careful transportation to a medical officer.

**NOTE:** A patient with a head injury that doesn't appear serious should be kept in bed for several days because symptoms are often delayed.

#### *Compound Fracture*

Knowledge of these wounds is of great importance in warfare. The term compound fracture implies that there has been a laceration of the scalp, a fracture of the bone, often a laceration of the membrane surrounding the brain, and a penetration of the brain itself by various objects such as bullets, glass, shrapnel, fragments of scalp, hair, dirt, and so forth. The greatest immediate concern in these cases is the checking of hemorrhage (compresses) and the combatting of infection. Beyond this, treat generally as for a skull fracture.

## Neck or Spine

Spinal fractures whether of the neck or back, and with possible accompanying injury to the spinal cord, are frequent in mechanized warfare. These accidents result in the fracture or dislocation of one or more vertebrae. Permanent paralysis may result from mishandling such cases. Be very careful in examination.

### *Symptoms:*

1. If the patient is conscious he may tell you where he is hurt. Pain in the back or neck may be the only symptom.
2. Ask him if he can move his feet and hands. If he cannot do this his neck is probably broken.
3. If he can move his fingers but not his feet and toes his back is probably broken.
4. If he cannot move these parts **DO NOT LIFT HIS HEAD** even enough to give him a drink of water. **DO NOT LET HIM TRY TO RISE OR SIT UP!** Transport as a broken neck case. If possible, try to have a medical officer see him before he is moved.
5. Lack of proper handling of these cases may result in severing or injury to the spinal cord with resulting permanent paralysis or death.

### *Treatment:*

1. Give morphine for pain or shock.
2. Make a careful inspection before transportation to a medical officer.

### *Neck:*

Before attempting to move a patient with a broken neck, the primary concern is to prevent increased damage to the spinal cord.

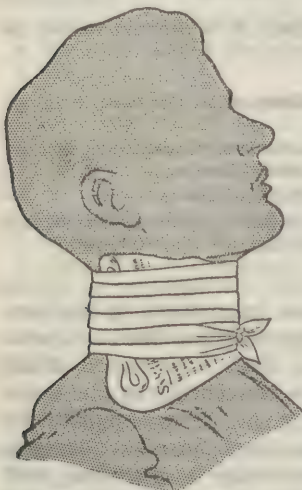


FIG. 73.—Splint made with a folded newspaper.

Damage to the spinal cord cannot be repaired. An improvised collar can be made to support the neck, made by using a newspaper, magazine, pillow or legging. (Fig. 73.) This can only be applied when the patient is found in a sitting position.

In order to move a patient with a severe fracture of the neck get some solid material such as a wide board or a door, and long enough so that it extends beyond the patient's head. Kneel above the patient's head and hold it steady with both hands. Have your assistants get a secure grip on the patient's clothing at the shoulder and hips and carefully slide him onto the board or door, while you move the head and neck as a unit with the body. (Fig. 75.) Keep

the patient's face upward, and support the sides of the head with padded bricks, sand bags, improvised rolls of clothing on each side, or other material to keep it from moving from side to side during transportation. Fold the arms across the chest and secure them with a bandage or safety pins. Tie the patient to the board with several bandages to hold him while he is being transported.



FIG. 74.—Head support to prevent further injury to the spine.

head firmly between your hands, and as your assistants roll the patient on his back onto the board, keeping the head steady and in line with the body as he is turned. Continue the procedure as previously described.

#### *Spine:*

*Although the desirable position for a fracture of the spine is on the abdomen, for long transportation it is more comfortable to the patient to lie on his back. When such a patient is found lying on his abdomen, enlist the help of several assistants and gently roll him onto the board, placing plenty of padding under the small of his back.*

The padding keeps the fractured vertebra separated and protects the spinal cord from injury. Tie the patient to the board to hold him while he is being transported. It is often impossible to be sure a man has a broken back. Treat all back injuries with acute pain as a fracture of the spine. Never let a suspected spine fracture be

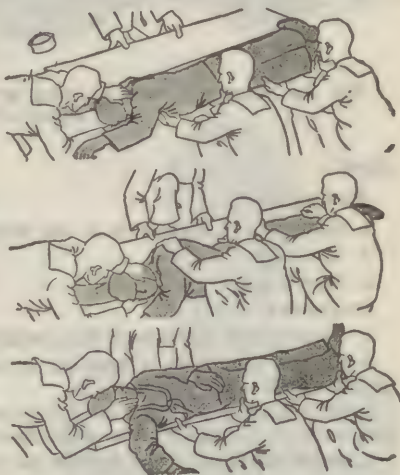


FIG. 75.—Placing a patient with a neck or back injury on a stretcher.

lifted or assume a sitting position. The most important thing to remember is that the sharp bone fragments will cut the spinal cord if they are moved. This will cause permanent paralysis of the body and legs (Fig. 76).

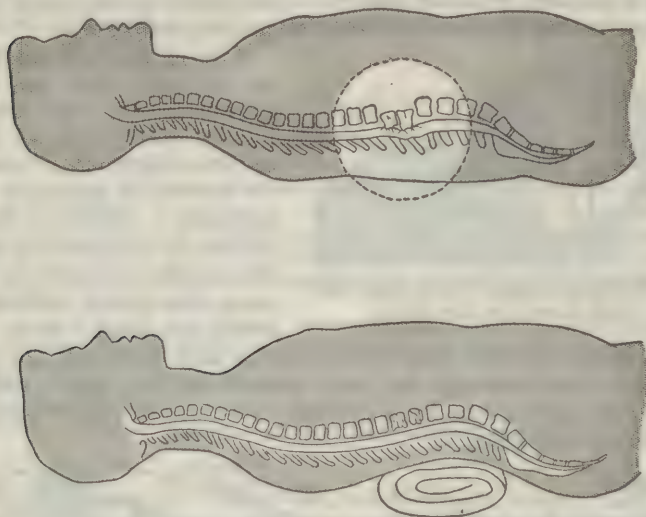


FIG. 76.—Cutaway view showing how padding prevents injury to spinal cord.

## **Nose**

### **Symptoms:**

1. Deformity or depression at the bridge.
2. Crepitus.
3. Nose bleed.

### **Treatment:**

1. Gently work bones back into original position.
2. Place a small roll of bandage on either side of the nose and secure in place with adhesive tape.
3. Stop nose bleed. Use cotton packs with or without Adrenalin Chloride solution. Remove these after 20 minutes.
4. Warn the patient not to blow his nose.

## **Clavicle (Collar Bone)**

### **Symptoms:**

1. The shoulder droops downward, inward, and forward.
2. Localized pain and tenderness.
3. The clavicle lying directly beneath the skin allows palpation of the deformity.

4. Patient usually supports his shoulder by holding the elbow with the uninjured arm or hand.

*Treatment:*

1. Give morphine for pain and shock.

2. In an emergency prepare a triangular sling, and place the hand drawn high to the uninjured shoulder. Tie a cravat around the upper arm and chest securing the ends under the opposite arm as shown in Fig. 77.

3. The figure of eight bandage may be used; it holds the shoulders backward and immobilizes the fracture. Be sure that it is firmly applied. First pad the axillas to prevent the bandage from cutting. Hold the end of a 3-inch bandage on the outside of the shoulder, and carry the roller diagonally downward across the shoulder blades around the axilla and over the shoulder of the opposite side. Continue downward across the shoulder blades to the axilla and up over the shoulder to the starting point. Repeat the procedure for three additional turns, overlapping the preceding turn by one-third its width. Secure the end with a pin or adhesive tape (Fig. 78).

4. Transport to a medical officer.



FIG. 77.—Sling for clavicle fracture.

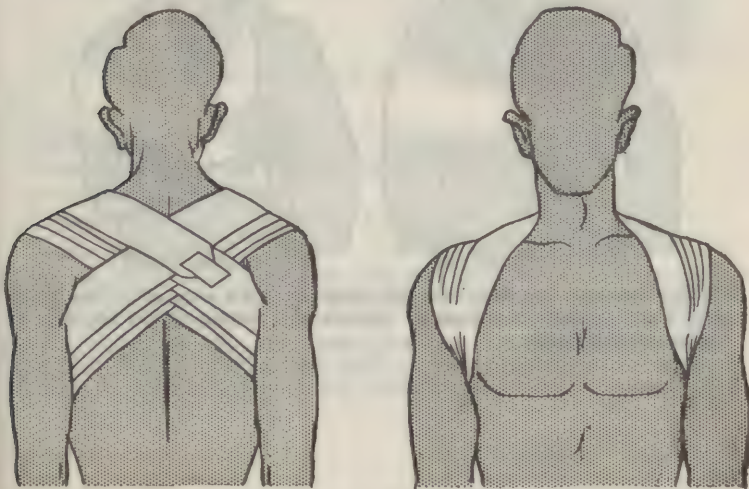


FIG. 78.—Immobilization of shoulders for clavicle fracture.

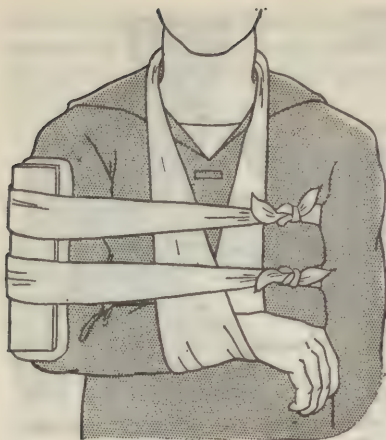


FIG. 79.—Sling for humerus fracture.

material is available, bind the broken arm to the side of the chest with pieces of shirt, neck tie, or other material, and support the forearm in a sling. Note that in either instance, the triangular sling is not used. This is the one exception. The narrow cravat sling allows the weight of the forearm and elbow to produce traction on the arm (Fig. 80).

## Humerus (Upper Arm)

*Symptoms:* (See symptoms of fracture, p. 60.)

1. Loss of function.
2. Pain.

### *Treatment:*

Place the arm in normal position and gently bend the elbow to a right angle. Pad a splint and apply it to the outer surface of the injured arm. It may be held in place by a roller bandage or tied with two cravats—one just above the elbow and the other at the level of the axilla (arm pit). Support the forearm with a cravat sling, or muslin bandage around the wrist. Anchor the arm to the side of the body with a cravat bandage or a roller bandage. If no first aid

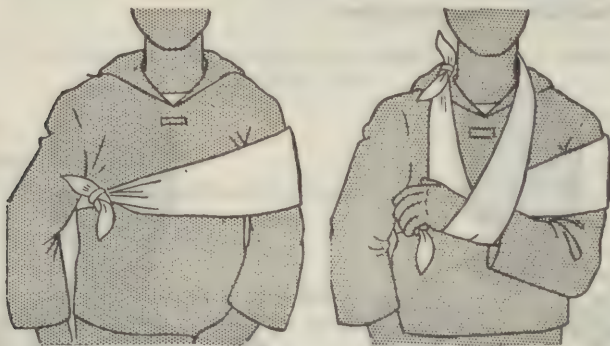


FIG. 80.—Humerus fracture. On left, arm is merely secured to the body. Additional support is gained by the use of a second cravat bandage as shown on the right.

**Wire mesh splint for the arm.** A roll of mesh wire 5 inches wide and 36 inches long is standard equipment in Navy first-aid kits. With it excellent splints may be made for the upper arm, elbow, or lower arm. It should be well padded. After application complete sling.

## Elbow

### Symptoms:

1. Pain and swelling.
2. Loss of function.
3. Distorted contour of elbow joint.

### Treatment:

Splint the fracture of the elbow in the position it is at the time you apply first aid. If the arm is bent at the elbow, apply an arm sling and bandage the arm to the side of the body. If the arm is straight, do not bend it but apply a padded splint from the axilla to the hand and secure it with a roller bandage or four cravat bandages (Fig. 82).

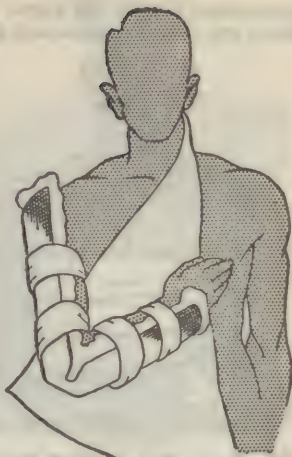


FIG. 81.—Wire mesh splint.

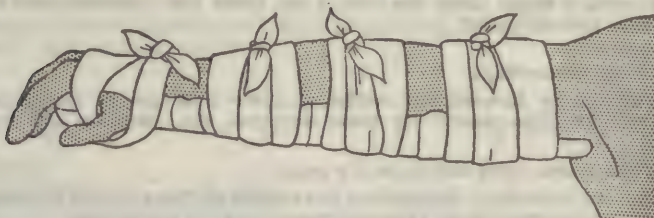


FIG. 82.—Splint for elbow joint fracture.

## Ribs

### Symptoms:

1. Sharp pain becomes worse on breathing or coughing.
2. Localized tenderness.
3. History of injury.

### Treatment:

The object of the first-aid treatment is to apply broad bandages around the patient's chest in such a manner that the injured ribs are well supported and move little on breathing. Three cravat bandages are necessary to immobilize the ribs. Place the first bandage around the upper part of the chest, tying a loose knot on the uninjured side. Apply the second and third bandages a little lower but in a similar manner. Place

compresses under the knots to prevent any discomfort to the patient. Have the patient exhale and tighten all three bandages starting with the top one.

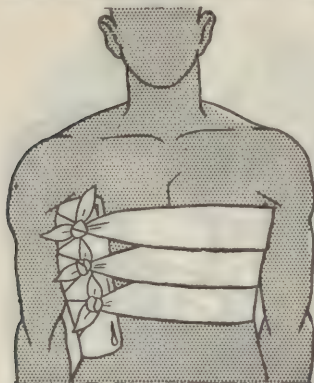


FIG. 83.—Cravat bandage for rib fracture.

A better method is to use adhesive tape if such is available. Use wide strips of adhesive tape so as to almost encircle the chest which will decrease movement of the broken ribs. First, shave hair from chest. Then after the patient has completely exhaled, apply several strips of 2½ inch wide adhesive tape, each succeeding strip overlapping the one below by 1 inch. The strips should encircle the chest, except for a space of about 8 or 10 inches on the uninjured side. (Fig. 84.)

### *Lower Jaw*

#### *Symptoms:*

1. Teeth out of alignment.
2. Difficulty in opening or closing mouth. In some instances mouth cannot be closed.

3. Pain and deformity at site of fracture.

4. Passing a finger along the line of the lower jaw, localized pain and deformity may be noted.

#### *Treatment:*

1. Check hemorrhage.

2. Pull tongue forward and secure, if there is danger of the patient choking. Examine mouth for loose dentures, etc. Remove any loose object.

3. Treat shock—give morphine for pain.

4. Prevent infection. Lacerations of external surfaces should be dusted with sulfanilamide. Give Tetanus Toxoid as soon as possible.

5. Apply dressing. (P. 49.)

6. The lower jaw is so well balanced by muscle balance that, unless the lower jaw is badly shattered, no treatment for support is often better than treatment administered without full appreciation of the condition present.

7. Get patient to a Medical or Dental Officer.

### *Bones of the Forearm*

#### *Symptoms:*

The general signs and symptoms of a fracture are present.

#### *Treatment:*

One or both bones may be broken, but usually only one bone is fractured, and when such is the case it may be misleading because the arm is still able to function. Put the patient on his back, bend the arm

gently at right angles so that the palm side of the arm rests on his body with the thumb pointing toward the head. Apply two padded splints long enough to reach from the elbow to the first joint of the fingers. Tie with cravats or with roller bandage and support arm with a triangular sling. The splints may be improvised from wooden boards, cardboard, newspapers, or any pliable material.

### Colle's Fracture

A Colle's fracture is a break of the lower end of the radius, just above the wrist joint. This is accompanied by a well-marked deformity, usually called the "silver fork" deformity. The lower fragment is displaced obliquely up and back and the hand usually abducted. Often there is a radial deviation of the hand, accompanied by pain and discoloration.

#### Treatment:

Immobilize by applying two splints extending from elbow to below the wrist. Pad well and use sling.

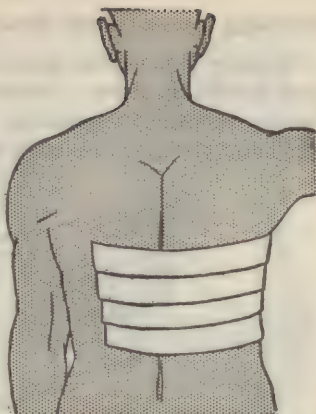


FIG. 84.—Adhesive straps for rib fracture.

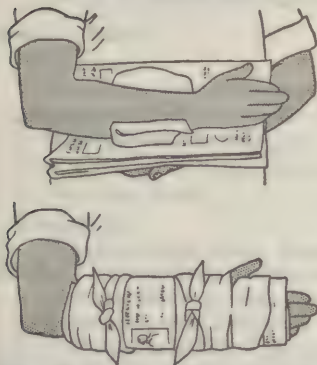


FIG. 85.—Newspaper splint for forearm fracture.

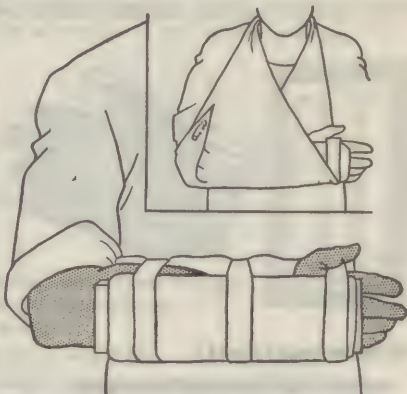


FIG. 86.—Board splint and sling for forearm fracture.

## ***Crushing Injuries of the Hand or Wrist***

If there is bleeding, dress the hand with a sterile dressing and pad well with cotton. Place a splint on the least injured side and secure it, but not too tightly. Place arm in a triangular sling with the hand elevated above the elbow.

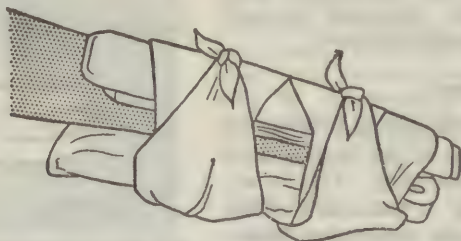


FIG. 87.—Splint for crushing injuries of the hand or wrist.

## ***Thumb Splint***

An effective temporary splint for the thumb can be made by placing 3 wooden tongue depressors on the sticky side of a strip of adhesive tape and overlap them with another piece of adhesive of the same size. Bend the splint to fit the part, pad it with cotton, and secure it to the thumb with a 1-inch spica bandage (Fig. 88).

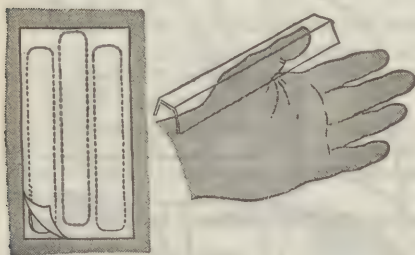


FIG. 88.—Tongue blade splint for thumb fracture.

## ***Metacarpals (Hand)***

*Symptoms:* Pain and deformity.

*Treatment:*

1. Place closed fist over a bandage roll, or
2. Apply splints from fingertips to middle of forearm on back and front.

## **Phalanges (Fingers)**

### *Symptoms:*

Pain, angulation, some deformity of bone.

### *Treatment:*

1. Injuries to the fingers are difficult to diagnose. Therefore, a deformity may be a fracture or a dislocation or both. Regardless, play safe, and put the injured finger in a splint. A simple temporary splint can be made from a tongue blade or a similar piece of wood, by padding it and tying it to the finger with adhesive (Fig. 89).

2. If no splint is available, bandage it to the adjacent finger.

## **Pelvis**

### *Symptoms:*

1. Patient unable to stand.
2. Pain from side to side and muscle spasm.
3. Evident displacement.
4. Local tenderness and swelling.

### *Treatment:*

1. Bandage the flexed knees and ankles together to overcome further damage by motion.

2. Patient must lie quietly on his back.

3. Morphine for pain.

4. Apply a tight binder about the pelvic region.

5. Gently move him on some rigid structure (a flat board or door).

## **Femur (Thigh)**

### *Symptoms:*

1. Shortening by angulations.
2. Loss of power in the limb. Patient unable to lift it.
3. Disalignment, with crepitus.
4. Abnormal inward and outward rotation of the feet.
5. Pain and shock.

### *Treatment:*

1. If compounded, check hemorrhage and dress wound. Use sulfanilamide or sulfathiazole powder and sterile dressing.

2. Give morphine for pain and shock.

3. Immobilize with a Thomas splint if available.

4. If a Thomas splint is not available use a coaptation splint. Grasp the foot on the injured side by placing one hand over the instep and the other over the heel. Gently straighten the leg until it is level with the other. Have an assistant hold it there with moderate traction.

Secure two splints, one long enough to extend from the axilla to a short distance below the heel, and the other from the crotch to the heel. Pad them well with blankets, sheets, clothing, or any suitable material. Pad the axilla and crotch on the injured side to prevent pressure. Place the shorter splint on the inner side of the leg and the longer splint on the outer side. Pass a series of seven cravat bandages under the patient's



FIG. 89.—Tongue blade splint for a finger fracture.

body in a certain definite order, so that they come to lie in specific locations. This can be done by using a wire or a stick and pushing them under the hollow of the small of the back, the buttock, knee and ankle, and working them gently upwards or downwards until they come to lie in the approximate locations as shown in Fig. 93. Tie the splints to the body and reinforce the splint by tying the injured leg to the opposite one with several ties. If no splint is available, place a blanket between the legs and bind them together, using the uninjured leg as a splint. Transfer to a hospital. (Fig. 90.)



FIG. 90.—Blanket splint for femur fracture.

### ***Patella (Kneecap)***

The patella is a small bone which lies in front of the knee joint. The large tendon that straightens the leg is attached to it. When it is fractured the leg cannot be straightened. Usually a separation of the bone can be felt over the knee joint. A fracture of the patella is caused by a direct blow over the knee, or by sudden muscular action.



FIG. 91.—Splint for patella fracture.



FIG. 92.—Pillow splint for patella fracture.

### ***Treatment:***

Place the leg in a straight position. Use a splint, preferably a board, to extend from the buttock to the heel. Pad it well, with extra padding under the heel and hollow of the knee. Leave knee cap exposed and tie as illustrated in Fig. 91. A pillow splint is also satisfactory (Fig. 92).

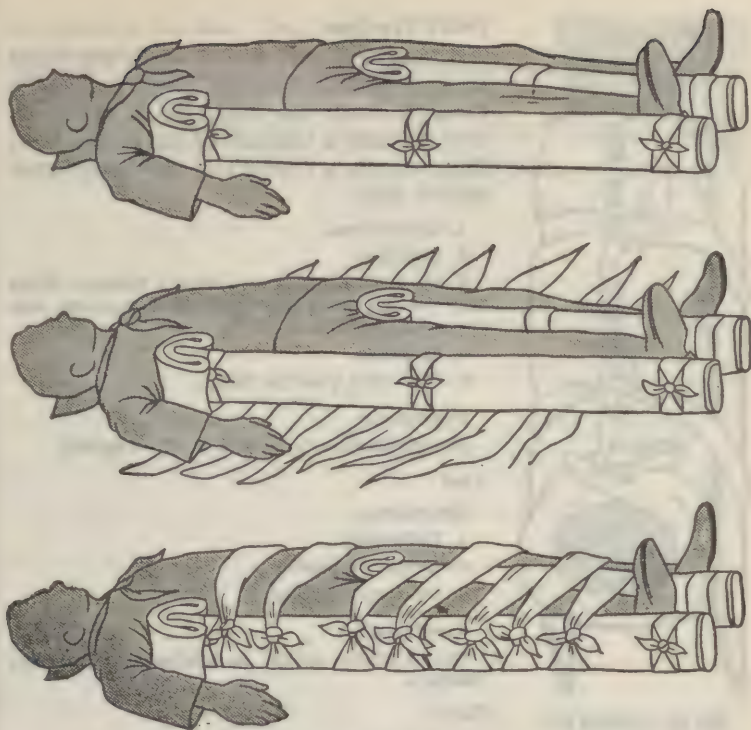


FIG. 93.—Application of splint for fracture of the femur.

### ***Fracture or Crushing of Foot or Toes***

Remove the shoe and sock. If necessary, cut them. Dress the foot and pad well with cotton. A pillow bandaged snugly around the foot and leg is a good procedure. Leave toes exposed to check circulation. (Fig. 94.)

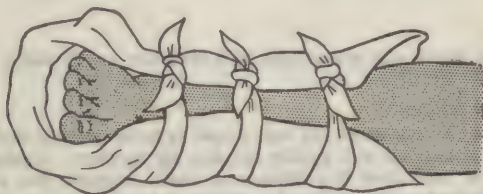


FIG. 94.—Pillow splint for crushing injuries of the foot or toes.



FIG. 95.—Splint for Pott's fracture.

### *Pott's Fracture*

A Pott's fracture is a break of the fibula an inch or two from the distal end and a break through the lower tip of the tibia. This includes a fracture of the medial malleolus with:

1. Tenderness.

2. Swelling.

3. No deformity, or in a severe fracture there may be marked deformity and turning out (eversion) of the foot.

4. Crepitus.

5. Pain and possible shock.

*Treatment:*

Immobilization by use of a pillow splint.

### *Feet*

*Symptoms:*

1. Deformity.

2. Unable to stand.

3. Pain and swelling.

*Treatment:*

Use a pillow splint as applied for a Pott's fracture.

### *Toes*

*Symptoms:*

1. History of injury followed by pain.

2. Swelling and tenderness.

3. May have crepitus.

*Treatment:*

1. Usually there is very little displacement so that no reduction is required.

2. Strap the fractured toe with adhesive, and use a shoe with slit in the toe to allow plenty of room.

### *Leg*

*Symptoms:*

The general signs and symptoms of a fracture are present.

*Treatment:*

1. Morphine for pain.

2. There are two bones in the leg; either or both may be broken. Grasp the foot, apply traction and gently lift the leg upward. Place a pillow on the under side, fold over the sides, and make several ties along the leg to hold it. Added support can be obtained by placing a stick or board over the pillow and under the ties. If a pillow is not available, apply two well padded splints, one on each side, that extend from the heel

to well above the knee. Tie with cravat bandages as illustrated in Fig. 96. If no material is available for a splint, place a smooth pad between the two legs and tie the two together.



FIG. 96.—Splint for lower leg fracture.

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## Boxboard Splints

The boxboard splint is made of the so-called "boxboard," and can easily be cut and folded to shape to immobilize all of the common fractures. It can be fireproofed and waterproofed. The splint is shaped as shown in the illustrations and is 15 inches wide and 32 inches long. The following illustrations show the method of using a boxboard splint for the most common fractures:

### For Forearm

#### Materials:

1. Outer section of boxboard splint.
2. Three cravat bandages.

#### Procedure:

1. Prepare section of boxboard splint as shown in diagram.
2. With arm lying across chest, bend splint around elbow, with ends extending to hand on both sides. Leave clothing on.
3. Fasten cravat bandages above and below suspected injury.
4. Support arm in sling.

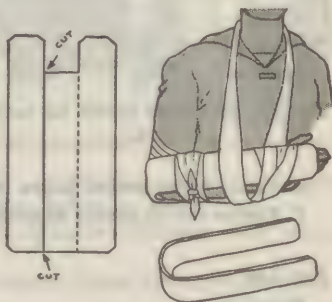


FIG. 97.—Boxboard splint for forearm bones fracture.

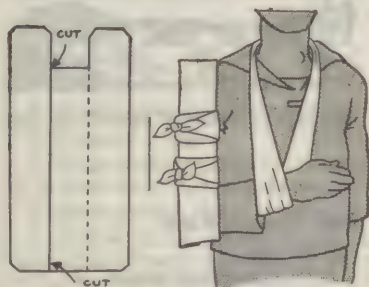


FIG. 98.—Boxboard splint for humerus fracture.

### For Upper Arm

#### Materials:

1. Outer section of boxboard splint.
2. Three cravat bandages.

#### Procedure:

1. Prepare section of boxboard splint as shown in diagram.
2. With arm lying across chest, slip folded end of splint under arm to armpit.
3. Fold other end around elbow to shoulder.
4. Tie cravat under arm and around shoulder and secure.
5. Tie cravat bandages above and below suspected break.
6. Support arm in sling.

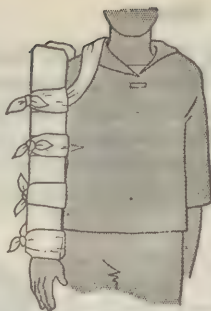


FIG. 99.—Boxboard splint for entire arm.

5. Fasten third cravat below suspected break.
6. Fasten fourth cravat at wrist.

### For Leg

#### Materials:

1. One boxboard splint.
2. Four cravat bandages.

#### Procedure:

1. Slip under injured legs from flaps at feet; fold side sections upward.
2. Tie with three cravat bandages, being sure to place one above and one below the suspected break.
3. Tie feet together.

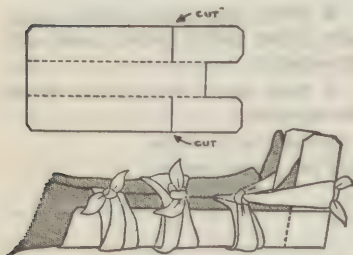


FIG. 101.—Boxboard splint for a crushed foot injury.

### For Entire Arm

#### Materials:

1. One boxboard splint.
2. Four cravat bandages.

#### Procedure:

1. Prepare splint as shown in the diagram.
2. Slip splint under arm with center fold under armpit, leaving clothing on for padding.
3. Fasten first cravat under arm and over shoulder, securing flaps.
4. Fasten second cravat above suspected break.



FIG. 100.—Boxboard splint for the leg.

### For Crushed Foot

#### Materials:

1. One boxboard splint.
2. Three cravat bandages.

#### Procedure:

1. Cut and fold splints as shown in diagram.
2. Place cravat under ankle and tie in front of ankle, continue ends around foot and secure.
3. Wrap second cravat around splint above ankle and secure.
4. Fasten both legs together with third cravat.

## For Broken Neck

### Materials:

1. One boxboard splint.
2. Six cravat bandages.
3. Two compresses or pads.

### Procedure:

1. Cut boxboard splint as shown in the diagram.

2. With patient lying on back, gently slip splint under head and back to desired position.

3. Fold flaps around side of head over ears, placing pads over ears.

4. Slip first cravat bandage under head and shoulder, so that it passes over one shoulder and under opposite arm, secure in front.

5. Put on second cravat bandage on opposite shoulder with same procedure.

6. Fasten third and fourth cravats around lower abdomen, securing in front.

7. Fasten fifth cravat bandage around body at hips holding arms at sides.

8. Fold back first fold of cravat, place center under chin, bring ends over head and flaps of splint and secure at the side.

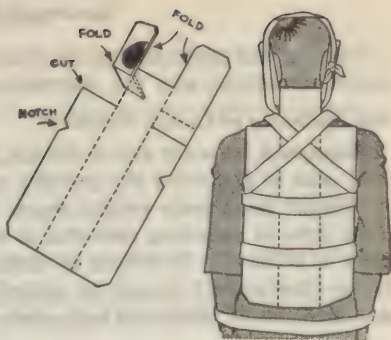


FIG. 102.—Boxboard splint for the neck.

## For Broken Back

### Materials:

1. Two boxboard splints.
2. Seven cravat bandages.

### Procedure:

1. With patient lying on his stomach, place first boxboard splint on back with flaps bent over shoulders.

2. Place second splint on back with flaps over each leg.

3. Follow same procedure as for broken neck. Place two cravats around shoulders, one around chest, one around abdomen, one around buttocks and arms, one around thighs, and one around ankles.

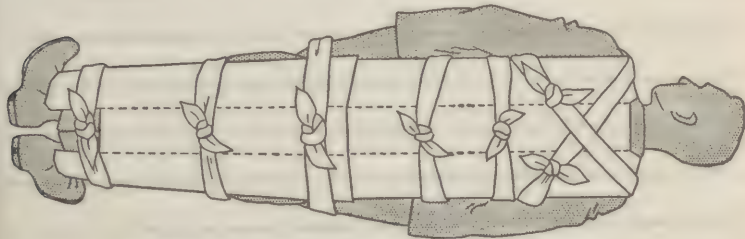


FIG. 103.—Boxboard splint for vertebra fracture.

## **Basswood Splints**

This type of splint is ideal for fractures or injuries of the forearm, carpal fractures and for coaptation splints.

### ***For Splinting of Colle's Fracture***

Basswood is easily cut to fit the form of the hand. In cutting it is wise to cut away the portion of the splint that usually forms a "hump" from bony prominences, such as the base of the thumb. This type of splinting material is also easily cut with an ordinary type of scissors. It should be kept in mind that padding (except in an emergency) should be added to obtain good immobilization and fixation of fractured bone ends. Do not bind too tightly.

## NOTES

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## ASEPSIS

Surgical asepsis means "surgically clean," or a condition in which living pathogenic bacteria are completely absent. Modern aseptic technic combats infection by preventing the entrance of such disease-causing bacteria into the tissues. Aseptic precautions account for nearly all the details of present day operating-room technic. The terms "sterile" or "sterilized" mean that disease-causing organisms have been eliminated by the use of heat or chemicals.

### *Essential Precautions in Surgical Asepsis*

It is necessary to make everything sterile and keep it sterile:

1. The patient's skin—by washing and the application of preparations such as merthiolate, iodine, etc.
2. The hands and clothing of the surgeon and his assistant. The hands must be extensively and thoroughly scrubbed, followed by a rinse in alcohol before putting on sterile rubber gloves.
3. All instruments or materials that come in contact with the wound or are handled by the surgeon or his assistants.
4. During the operation the surgeon and his assistants must not touch anything that is not sterile. Everything used must be sterile.

### *Asepsis in the Field*

When treating wounds under field conditions, it is sometimes impossible to achieve complete asepsis but every effort must be made to reach the highest degree possible through the use of drugs which combat infection. Sulfanilamide powder sprinkled into the wound is extensively used and supplies of it are furnished to the hospital corpsman. In addition, tablets of sulfadiazine are given orally, according to directions furnished on the packets.

## WOUNDS

A *wound* is a break in the skin or in the mucous membrane lining one of the body cavities. The term "traumatic wound" means a wound caused by mechanical violence. Traumatic wounds are always contaminated with bacteria.

### *Principal Types of Wounds*

1. *Aseptic*—clean, surgical.
2. *Septic*—dirty (these are the usual wounds).
3. *Poisoned*—snake, insect, sting, etc.

Wounds are further classified as:

1. *Abrasions*—wounds made by rubbing or scrapping of some rough object against the skin.
2. *Incised*—wounds made by sharp instrument (cuts).
3. *Lacerated*—wounds having ragged edges, torn and irregular. (Caused by machinery, fragments of missiles and blunt objects.) There may be dirt, grease or other contaminating material ground into wound.

4. Puncture wounds and stabs—wounds having a narrow, deep track, with small opening. (Caused by penetrating instruments such as nails, wire, knives, bullets, etc.)

5. Crushed wounds—a part or a whole area may be crushed and lacerated, damaging the tissues so severely that the blood supply may have been impaired with resulting infection and gangrene.

### *Treatment*

In the first-aid treatment of all types of fresh wounds the three main points are—*first*, stop severe bleeding; *second*, treat shock; and *third*, prevent infection.

General directions for first-aid treatment of wounds:

1. Stop severe bleeding—direct pressure, digital pressure, tourniquet.
2. Treat shock—keep patient lying down and comfortably warm. Give morphine if necessary.
3. Prevent infection:
  - (a) Remove large foreign bodies from wound; i. e., fragments of wood, clotting, missiles. Do not probe the wound.
  - (b) Do not touch the wound with anything unclean. Keep your fingers away from the wound.
  - (c) Do not attempt to clean a deep wound with soap and water or any detergent. (You only “wash in” more dirt than you wash out.) That is not the responsibility of the first aider. When the medical officer does this, he is giving treatment and not first aid.
  - (d) Apply a sterile gauze pad—Small and large size battle dressings, made of several thicknesses of sterile gauze, are carried in the first-aid kit ready for emergency use. When opened, the small battle dressing measures 4 inches by 6 inches, and the large battle dressing measures 12 inches square. If battle dressings are not available, several thicknesses of regular sterile gauze may be used to cover the wound.
  - (e) Bandage—Battle dressings are held securely in position by means of four gauze or muslin bandages attached firmly to the back of the sterile gauze pad. (Resembles a large four-tailed bandage.) These bandages or “tails” should be wrapped snugly about the pad and the injured part. Roller gauze or triangular bandages are used to hold regular gauze pads in position.

The use of iodine or other antiseptics on fresh wounds is not recommended, as antiseptics, may, in addition to killing germs, injure or kill the tissues surrounding the wound, thereby preventing healing. Recent experience with war wounds indicates that sulfonamides properly administered stops the growth of most germs causing wound infection.

Gas gangrene is unlikely to develop in a wound as long as it is left open. Therefore it is usually best not to attempt to suture or close open wounds. Merely cover the open wound with sterile gauze.

Keep the patient at rest. Body defenses are best increased by complete rest of the body and by elevation of the injured part.

# WAR WOUNDS

Previously described are the first-aid procedures to be followed when the hospital corpsman is primarily interested in giving first aid where a medical officer is available. However, when he is on independent duty or in the front lines and face to face with the responsibility of immediate treatment where medical officers are not immediately available, there are certain important fundamentals and procedures to remember.

## *General Procedures*

Incised, penetrating, blast, crush, compression, and burn injuries occurring separately or together, which may or may not be accompanied by hemorrhage, represent the general character of wounds produced in modern warfare.

All traumatic wounds are contaminated. All wounded persons should receive tetanus toxoid or tetanus antitoxin and in many cases an antitoxin against gas gangrene.

Remember the order of precedence in treatments:

1. Treat hemorrhage first.
2. Treat for shock.
3. Prevent infection by applying dressing.
4. Apply splints to fractures.

Casualties are evacuated from the field in order of the importance of their injuries. Discretion is required in choosing urgent cases for evacuation. The following is furnished as a general guide:

1. Abdominal injuries.
2. Head injuries.
3. Chest injuries.
4. Burn cases. (severe)
5. Injuries to the extremities.

Tag all patients showing dose and time morphine or tetanus injections were administered and other pertinent information, such as the time the tourniquet was applied.

## *General Treatment*

### *Superficial wounds:*

1. Remove dirt, grease, oil, etc., from around the wound, with soap and water. Liquid petrolatum or detergents should be used to remove oil and grease. Wash away from the wound not toward it.

2. Sprinkle sulfanilamide or sulfathiazole powder, covering the injured surfaces lightly, using not more than 15 Grams of sulfa drugs.

3. Apply a dressing and a bandage.

***Deep wounds:***

1. Control hemorrhage.
2. Treat the existing shock.
3. No attempt should be made to wash out deep wounds—bleeding might be reactivated and contamination increased.
4. Apply sulfanilamide or sulfathiazole powder. Do not use sulfathiazole powder in wounds of brain or scalp. Leave the wound open—do not suture it.
5. Apply dressing and bandage.
6. If the injury involves extensive fleshy parts, even though a fracture may not be present, immobilize with splints.

In traumatic wounds (crushed, lacerated, etc.,) there is more or less devitalized or killed tissues.

Healthy, living cells lining a clean wound have a remarkable capacity for preventing bacterial growth, whereas damaged or devitalized tissues in a wound favor bacterial growth.

Debridement consists of removing foreign bodies, loose fragments of bone and lacerated tissue devoid of blood supply. Such dead tissue is called necrotic tissue. Unless removed it furnishes the media for bacterial growth, sepsis (pus formation) in the wound, and may present a serious impairment to healing, including tetanus or gas gangrene infection.

NOTE: Local debridement of a wound except for the removal of foreign bodies, should be undertaken only by a medical officer; however, the reasons for debridement should be understood by the hospital corpsman. (p. 176.)

## SPECIAL TYPES OF INJURIES

### *Head Wounds*

All head wounds and wounds of the scalp should be considered as serious. If time is available, the hair about such wounds should be cut away with scissors, sulfanilamide crystals introduced and a snug compression bandage applied. Notes of the patient's condition (such as state of consciousness, paralysis of limbs, etc.) made at the time of dressing and sent along with the patient will be of aid to the doctor giving treatment later on. These patients should be evacuated face down if there is bleeding that might run into the air passage and interfere with breathing.

**CAUTION:** In head injuries use *sulfanilamide* crystals. **NEVER USE SULFATHIAZOLE** if there is any chance of the drug coming in contact with brain tissue. Sulfathiazole applied directly to brain tissue will cause serious damage.

### *Face Wounds*

Control of hemorrhage in such a wound was taken up under "Hemorrhage." When the lower jaw is shot away or otherwise seriously injured, the tongue falls back into the throat, choking the patient. This can be prevented by placing a safety pin or thread through the midline of the tongue, making a forward pull and secure. This may help in controlling hemorrhage at the base of tongue. These patients should be evacuated face down so that they do not bleed into their lungs. The primary objective in treating wounds of the face and neck is to stop hemorrhage, combat shock, and evacuate as soon as possible. Give a syrette of morphine for pain.

### *Gunshot Wounds Inflicted by Bullets*

Treat for hemorrhage and shock if present. Look for wound entrance and exit. Apply sulfanilamide and sterile dressings. Do not probe for bullet. Give morphine. Evacuate.

### *Wounds of the Extremities*

Check hemorrhage, combat shock, apply sulfanilamide and sterile dressings. Immobilize the part, and evacuate to dressing station. Apply splints to fractures.

### *Abdominal Wounds*

These wounds demand evacuation ahead of all other wounds as they must be operated upon early. Too much time should not be

lost combating shock. Get the patient to a medical officer. Most abdominal wounds required immediate major surgical treatment.

*Precautions:*

1. Keep the patient lying down on his back. Use a compress to check hemorrhage if necessary. Treat for shock.
2. Keep him warm.
3. Sprinkle sulfanilamide into wound. Apply dressing.
4. Give morphine for pain.
5. Do not give stimulants as they increase bleeding.
6. Give no liquids by mouth. Often the patient complains of great thirst. You may moisten the mouth with small amounts of water—just enough to keep the oral tissues from drying.

*Abdominal Wound With Intestine Protruding*

1. Place the patient on his back with coat or pillow under knees.
2. Do not try to push intestines back in but cover with a sterile dressing or clean cloth and keep moist. (Fig. 104.) Sterile normal saline is best but any water is safer than allowing the intestines to dry. Treat for shock.

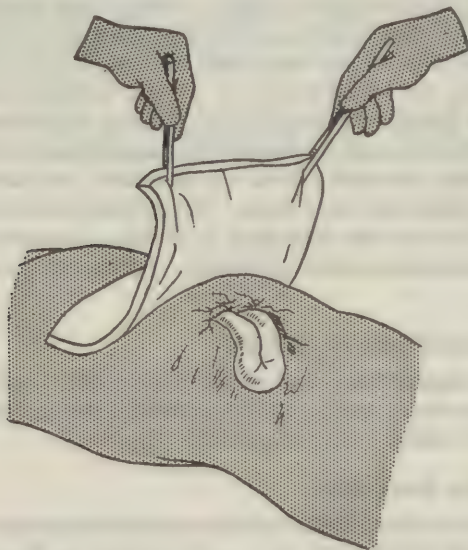


FIG. 104.—Dressing for an abdominal wound with protruding intestine.

3. Give morphine.
4. Reassure patient.
5. Evacuate him at once.

## Wounds of the Chest

Sucking wounds of the chest (the air rushes back and forth through an opening with each respiratory movement) cause shock and death unless cared for early. These wounds must be closed quickly with any means at hand if the patient is to live. This may be done by covering the wound with adhesive, a tight compress, stuffing the hole with a piece of sterile gauze soaked with petrolatum or cloth (even part of a shirt), pinning the edges together with safety pins, or sewing the edges together with any needle and thread available. (Fig. 105.) Evacuate as soon as possible.

If one side is injured keep the victim lying on the injured side. The weight will help close the hole and likewise keep the blood from seeping into the uninjured lung. Give morphine for pain and anxiety.

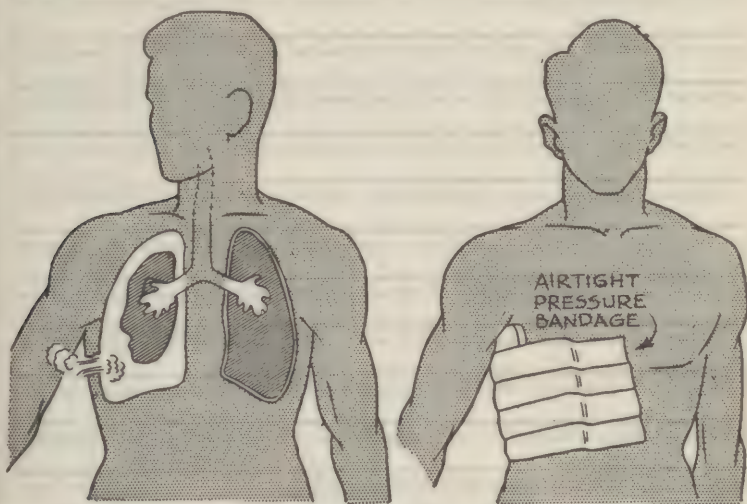


FIG. 105.—Diagrammatic view (left) showing collapse of the lung following a chest wound. It is necessary to close the opening and bind the dressing securely.

## NOTES

## NOTES

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## CONTUSION (Bruise)

A *contusion* is caused by a blow to some part of the body, and though the skin is usually not broken, there may be extensive damage to underlying muscles, tendons, blood vessels, and nerves. Blood oozes from the broken vessels into the soft tissues under the skin causing swelling and discoloration which is commonly known as a "black and blue" mark. A bruise is usually not serious; however, severe blows to the head, chest, and abdomen may result in serious internal injuries even though the only visible evidence of the injury is a "bruise."

### Symptoms

1. Pain is felt at the site of the blow.
2. Swelling—Caused by blood oozing into the soft tissues under the skin.
3. Discoloration—A fresh bruise is red. Gradually the skin becomes "black and blue," then after 3 or 4 days becomes green or yellow.
4. Tenderness.
5. Impaired function.

### Treatment

1. The injured part should be protected and kept at rest.
2. A bruised hand or arm may be supported in a sling while a bruised leg should be elevated on pillows or folded blankets.
3. Apply an ice bag or cold cloths, wrung out in ice water, to the bruise during the first 24 hours.
4. After 24 to 36 hours the application of heat and gentle massage helps diminish the swelling and discoloration.
5. The patient is often made more comfortable if a gauze or elastic bandage is applied snugly about the bruise.
6. If the bruise is complicated by serious internal injuries, it will be necessary to treat the patient for shock.

## STRAINS

A *strain* is the over-stretching of a muscle or tendon with a rupture of the muscle or tendon fibers. This is due to vigorous muscular effort such as lifting, running, or jumping. The muscles of the back are often involved, the thigh and leg muscles less frequently.

### Symptoms

1. Pain—Develops in the muscle at the time of physical effort.
2. Lameness—The injured muscle is unable to function properly.
3. Swelling—Moderate swelling may develop at the site of a muscular injury.

4. **Stiffness**—The injured muscle becomes stiff and “knotted” as in the so-called “Charley horse.”

5. **Aching**—The pain subsides and is replaced by an aching and tenderness.

### ***Treatment***

1. The injured muscle should be put at rest.

2. If the strained muscle is in the arm, support it with a sling. If it is in the leg, elevate the leg on pillows or folded blankets.

3. Hot wet gauze dressings, hot water bottles, or a heat lamp may be used to apply heat to the injured area.

4. In the absence of surgery, immobilize the part with splints or bandages and place the affected part in a position so that muscles will relax, thus allowing torn fibers to heal together.

## **SPRAINS**

A *sprain* is an injury of the joint ligaments caused by an abrupt stretching or twisting of a joint beyond its limit of motion with damage to the adjacent tissues. There is no displacement or damage to the bones. The ankle, knee, finger, and wrist joints suffer most frequently.

### ***Symptoms***

1. Sharp pain is felt in the joint at the moment of injury.

2. Swelling develops rapidly about the joint.

3. Tenderness.

4. Loss of function of the part involved.

5. Discoloration.

### ***Treatment***

1. The injured ligaments should be put at rest by preventing use or movement of the joint.

2. If the injured joint is in the arm or leg, the injured part should be elevated to help reduce pain and swelling.

3. An ice bag or cloths wrung out in ice water should be applied to the injured joint for the first 24 hours.

4. After 24 to 36 hours the pain will have subsided and heat should be applied to obtain early return of joint function.

5. **Bandage**—A snugly fitting adhesive or elastic bandage about the joints helps support the injured ligaments. Care should be taken to loosen the bandage if it interferes with circulation of the blood. (See fig. 41 for treatment of a sprained ankle.)

Sometimes it is difficult to tell the difference between a sprain and a fracture. *If in doubt, treat as a fracture.*

## DISLOCATIONS

A *dislocation* is the forcible displacement of a bone from its joint. This displacement may be momentary, the bone returning to its normal position, or it may remain dislocated until replaced.

### *Symptoms*

Shock, pain, swelling, loss of function, limited motion, and deformity are the symptoms of dislocation. The limb may seem lengthened or shortened, according to the type of dislocation. Most common dislocations are those of the shoulders, elbows, fingers, ankle, knees, and rarely, the hip.

### *Treatment*

Under no circumstances should an attempt be made to reduce the dislocation unless a medical officer is unavailable. Splint the dislocation as you would a fracture. Give morphine to ease pain. Put the part in the position most comfortable to the patient. The joint should be surrounded with cotton and a bandage applied, not too tight, and then supported. The patient should be kept as quiet as possible. If the joint involved is the shoulder, elbow, hip, knee, or ankle, the patient should be kept in bed. If the joint is painful and greatly swollen, hot or cold applications may be applied. A sling makes a good support to the shoulder, elbow, and wrist joints. If shock is present, treat it. Have patient see the doctor as soon as possible.

### Dislocation of the Shoulder

#### *Symptoms*

1. Flattened shoulder, depressed axilla. Dimpling beneath acromial (spinal) process of the scapula (Fig. 106).
2. Deformity; head of the bone in an abnormal position.
3. Fixation.
4. No crepitus.
5. Limited motion.

#### *Emergency Treatment*

1. Make patient as comfortable as possible.
2. Apply cold compresses to relieve pain.
3. Treat shock if present.
4. Immobilize part by sling.
5. Send for a medical officer.

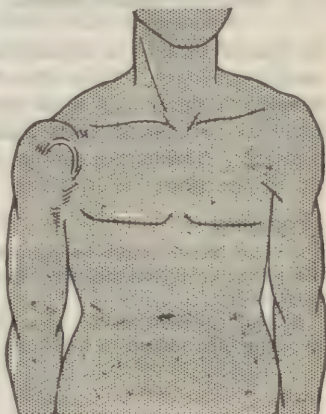


FIG. 106.—Shoulder dislocation.  
Note dimpling.

## Dislocations of the Hip-Joint, Elbow and Knees

These are uncommon. Treat as emergency cases. Immobilize with proper splinting. Combat shock. Summon medical aid.

### Dislocation of Fingers

The finger joints are the most important joints of the upper limb. These joints are particularly susceptible to injury, and very readily stiffen following even minor injuries, so that improper treatment may result in months of incapacity. Every finger injury must be treated with the greatest respect.

Dislocation of the thumb and finger joints are produced by hyper-extension injury.

#### *Treatment (Finger)*

1. Reduce by traction and flexion of the joint.
2. Put finger in cast or splint.
3. Check by x-ray for fracture.

#### *Mallet Finger*

In the *mallet* or *baseball* finger the extensor tendon is torn from the base of the terminal phalanx (or bone) of the finger (Fig. 107). This means that the patient can bend the tip of his finger but

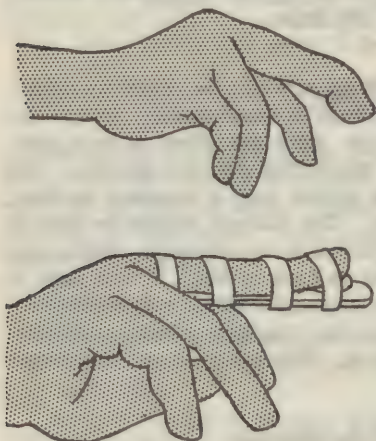


FIG. 107.—Mallet finger.

he cannot extend or straighten it because the tendon that pulls it up is torn loose. This type of injury is often overlooked and may develop a deformity with permanent loss of extension. Only a surgical procedure then can restore the tendon to its normal position. Therefore, always look for this type of injury when the tip of the finger is involved.

#### *Treatment*

1. The finger must be immobilized by a plaster cast or splint with the finger extended and the tip of the finger or the terminal joint hyper-extended.
2. The application of this type of cast usually requires experience. If no medical officer is available, splint as shown in Fig. 107.

## Dislocation of the Jaw

This condition usually occurs while yawning or may be caused by a blow upon the jaw when the mouth is open. This is the simplest type of dislocation to reduce.

### Symptoms

1. Inability to speak.
2. Unable to close mouth.

### Treatment

1. Make sure to adequately protect both of your thumbs with gauze or a bandage, to prevent the thumbs from being bitten by the sudden snap resulting following reduction.

2. Stand in front of the patient. Apply pressure downward on the lower jaw with padded thumbs in the region just behind the lower molars. At the same time direct pressure upwards with the other fingers against the chin (Fig. 108).

3. After reduction, no further treatment is necessary.

4. The patient should be advised to avoid opening the mouth more frequently than is necessary for a few hours following reduction.

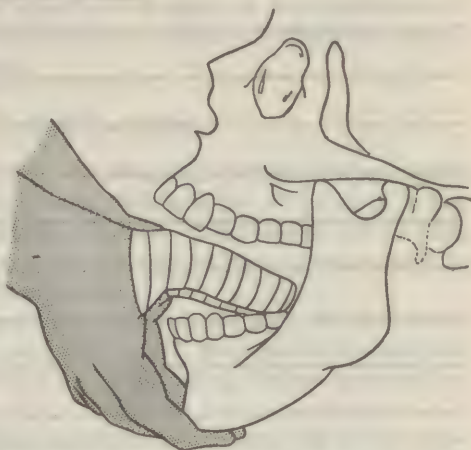


FIG. 108.—Proper position to assume in reducing a jaw bone dislocation. Note the importance of bandaging the thumbs to prevent injury when the jaw bone snaps back into place.

## NOTES

## TRANSPORTATION OF A PATIENT

The method of transporting a seriously injured person cannot be over-emphasized. It is just as important as any other first-aid procedure. The patient's life as well as much of the further treatment may depend upon the manner in which you move and transport him after the accident.

### General Procedures

The various methods of "carrying" should only be used to remove a patient from a dangerous area such as a fire, or when it is the only means of transportation available. They should not be used unless the victim is only in need of slight support or when he is to be moved for only a short distance.

First, see that all hemorrhage has been arrested, fractures and dislocations immobilized, wounds dressed, pain controlled, and the treatment for shock instituted, if necessary, before moving the patient.

Protect the patient against exposure by covering him with a sufficient number of blankets, garments, or with whatever material is available.

Be gentle in moving him so you do not aggravate the patient's condition by rough handling.

Certain injuries require special handling in order that further injury is not produced and that splints and dressings do not come loose. See that the patient is transported or carried in such a way to protect his injuries and that harmful pressure is not applied to the injured area.

A patient suspected of having a fractured spine should be transported in such a way that the spine is in a position of extension. This can be accomplished by placing a folded blanket or pillow under the small of the back.

Whenever possible, carry the stretcher to the patient and not the patient to the stretcher.

Secure the patient to the litter so that there is no danger of his falling out, and in case of a fracture of the neck or spine see that there is adequate mobilization (Fig. 74).

Four men are necessary to carry the litter and an additional one, if available, can help to attend to the needs of the injured as he is being transported. See that you have an adequate number of bearers.

## ***Improvised Stretchers***

In many instances it will be necessary to improvise a stretcher. Camp cots, boards, doors, window shutters, benches, and properly padded ladders, can be used in an emergency. If you improvise any such stretcher, always test it before putting a patient on it. However, there are other methods of improvising stretchers that are more satisfactory.

**Blanket stretcher:** For this type of stretcher it is necessary to have 2 poles about 7 feet long. Spread a blanket on the ground, place one pole across the center of the blanket and fold the blanket over it. Place the second pole across the center of the new fold and fold the other half of the blanket over this pole as you did the first (Fig. 109). A rug, robe or a strong sheet can also be used.

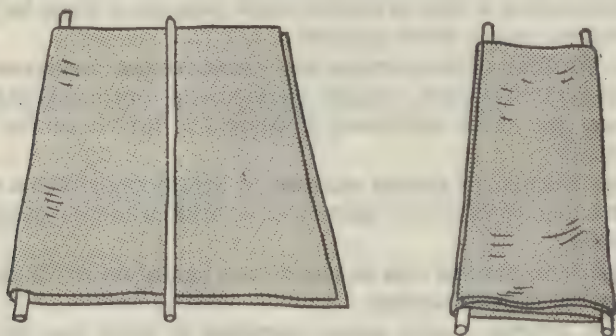


FIG. 109.—Improvised blanket stretcher.

Another good method is to snip off the corners of sacks, bags, or bed ticks, and place the poles through them. If the patient is to be carried for some distance, it is much easier for the bearers and the patient if you tie cross pieces at each end of the poles to keep them apart.

If blankets, sheets, or other materials are not available, the two-coat or coat and vest method can be used. Turn the sleeves of the coat or coats inside out, button them, and spread them on the ground with the neck of each garment facing in the same direction. The backs of the garments form the bed (Fig. 110). Jumpers and blouses can also be used.



FIG. 110.—Improvised jumper stretcher.

If only a blanket is available and no poles, place the victim on the middle of the blanket, and roll the edges of the blanket in from each side. At least three or more men should stand on opposite sides of the patient, and grasp the rolled edges of the blanket when lifting him (Fig. 111). When such an improvised stretcher is used, the more hands assigned to lift the patient the better, as more hands mean the blanket will be kept from sagging and thus "jack knifing" the patient.

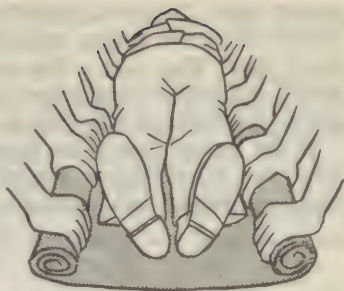


FIG. 111.—Improvised blanket carry.

When lifting the injured person onto the stretcher take care that it is done in the proper manner. The patient should be turned flat on his back. At least three men should take part

in the lifting, preferably four. One should act as the leader and give the orders so that all will lift in unison.

The three men should line up on the uninjured side of the patient, and the fourth on the injured side. The first man supports the head, neck, and shoulders; the second, the back and hips, and the third, the knees and ankles. The fourth stands on the opposite side near the patient's hips, where he can either help with the lifting, care for the injured part, or handle the stretcher.

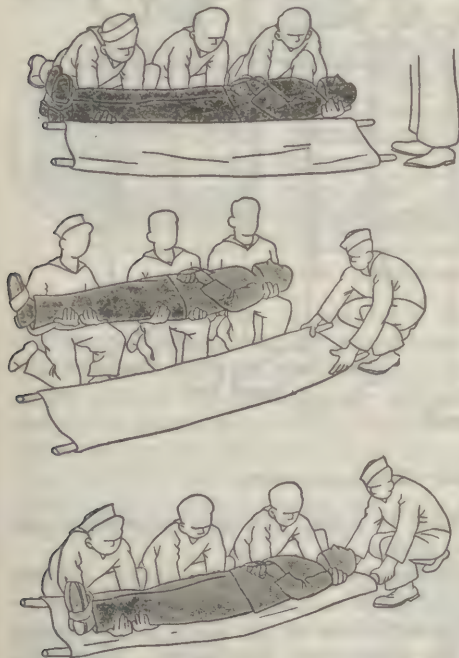


FIG. 112.—Lifting a patient to a stretcher.

All hands face the patient and kneel on the knee nearest the patient's feet. In unison, roll the patient slightly away and place the hands under the body at their respective locations. When the

leader asks, "Are you ready? Lift." All bearers answer in the affirmative when ready, and lift the patient to their knees on the word "lift" (Fig. 112). The fourth man then places the stretcher under the patient and when the command "lower" is given, they lower the victim gently onto it.

If the patient has to be lifted and carried some distance to the stretcher, the three men rise off their knees in unison and carefully carry the patient against their chests (Fig. 113). When the patient



FIG. 113.—Three-man carry.

is removed from the stretcher to a bed, the same procedures are carried out only in reverse order.

As soon as the patient has been lowered to the stretcher, covered with blankets or clothing and made as comfortable as possible for the journey, the four bearers each take an end of the stretcher and lift in unison, following the order from the leader. Carry the patient slowly, and feet first unless going up a long hill, then he should be carried head first. Keep him level as much as possible. *The stretcher bearers must not keep step.* An overcoat, a blanket

or some garment may be used as a pillow. Do not use a pillow under the head in cases of injury to the neck.

Difficulty in breathing due to wounds of the chest is sometimes relieved by judicious elevation of the shoulders. In wounds of the abdomen the best position is on the injured side, or on the back if the front of the abdomen is wounded—the legs being drawn up and supported. In injuries of the upper extremity the best position is on the back with the arm across the body or suitably placed by the side. In injuries of the lower extremity the patient should be on his back.

### *Service Litters*

*Stokes Stretcher:* In most instances when the hospital corpsman is faced with the problem of transporting a severely injured person, the Navy's service litter called the Stokes's stretcher, will be available. It is a wire basket supported by iron or aluminum rods (Fig. 114). It is used aboard ship, especially, for loading patients to and from boats.

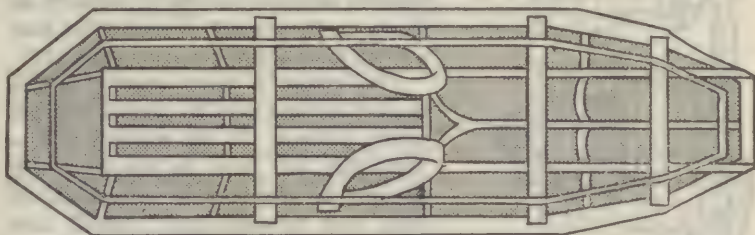


FIG. 114.—Stokes stretcher.

Before placing the patient in a Stokes stretcher, cover the stretcher with two blankets placed lengthwise, so that one blanket extends down each leg, and use a third blanket folded in half in the upper part of the stretcher to protect the head and shoulders. Lower the patient gently onto the stretcher and make him comfortable. Secure the patient's feet to the foot of the stretcher to prevent him from sliding up and down. Cover him with blankets and secure him in place by using the three straps and fastening them over his chest, hips and knees.

*The Army Litter* (Fig. 115) is made essentially of canvas and is supported by wooden or aluminum poles. It is collapsible and is the most practicable for use in the field.

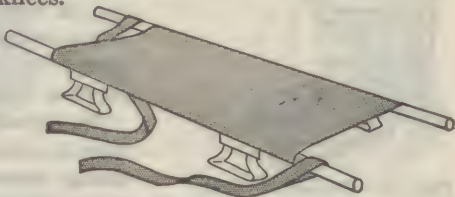


FIG. 115.—Army litter.

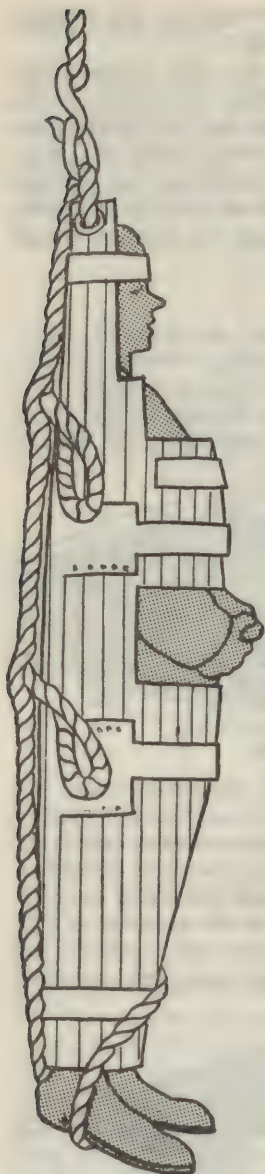


FIG. 116.—Neil-Robertson stretcher.

The *Neil Robertson Stretcher* officially adopted by the British Navy, is especially adapted to transport casualties from engine rooms, holds and other compartments where access hatches are too small to permit the use of the Stokes or Army litter. The stretcher is made of semi-rigid canvas, and is wrapped around the patient like a mummy wrapping. This permits him to be hoisted out of these difficult places (Fig. 116).

### *Other Carries*

A hospital corpsman may have to transport a patient without help. If so, he may support a conscious and slightly injured patient in walking as shown in Figure 117, or can carry him a short distance in his arms (Fig. 118).

The "pack a back carry" is the easiest for one man to carry a not too heavy patient. If the patient is unconscious, lift him to his feet, slip around in front with your back to him, lean forward and "hunch" him high on your back, and grab his hands and legs as shown in Figure 119.

For a heavy patient, if you use the "pack strap" carry, you can carry a greater weight a longer distance than with any other method. Lift the patient, slide in front, "hunch" him high on your shoulders, so that his arm pits are almost on top of your shoulders, and cross his arms in front where they can be held with one or both hands. If you use this method, it will be necessary for you to walk in a stooped position (Fig. 120).

*Tie Hands, Crawl Carry:* If the patient is wounded during battle, under enemy observation or the resultant fire in the location of the patient may



FIG. 117.—Aiding a “walking” patient.



FIG. 118.—For short distances a patient may be carried in the arms.

render the previous methods of carrying impracticable, the “tie-hands, crawl or carry” method may be used.

Roll the patient on his back and first tie his wrists together. Lie down with your back against him and insert your head and left shoulder through the loop formed by the patient’s tied wrists.



FIG. 119.—“Pack-a-back” carry.



FIG. 120.—Pack-strap carry.

Lie with your back against the left side of the patient's body and parallel to it with your right foot between the patient's legs. Reach around with your left hand and grab the patient's right elbow. With your right foot push upward against his right foot to help bend his knee and at the same time grasp the thigh with your right arm (Fig. 121). Turn on your left side and then onto your abdomen pulling the patient with you. The patient is now on your back.



FIG. 121.—“Tie hands” carry showing how to pick a patient up.

After assuming this position you can creep or crawl, or if you wish, rise erect and walk. This method also permits the bearer to climb ladders. If you find it necessary to carry the patient “pack a back”, just reach behind, grasp and support his legs.

**Fireman's Carry:** This is one of the easiest methods to carry an unconscious patient and one which has proved to be the most practical. Turn the patient on his face and kneel on one knee at the head of the patient, facing him. Place both hands under the

arm pits and gradually work them down the patient's side and across his back. Raise the victim to his knees, then take a firmer hold across the back and raise him to his feet. Next seize the right wrist of the patient with your left hand and draw his arm over your head and down your left shoulder as shown in Figure 122.



FIG. 122.—Firemen's carry, showing how to pick a patient up and put him down.

At the same time reach down with your right arm and pass it around the victim's right thigh and grasp his right wrist. This leaves your left hand free. In lowering the patient the procedures are reversed. Should the patient be wounded in such a manner as to require the procedure to be conducted from the right side

instead of the left, simply change the hands, and proceed in the same manner, substituting the right for left and vice-versa.

The "Drag" is used to drag or haul an unconscious patient from beneath a low structure and for a short distance. Tie the patient's wrists around your neck (Fig. 123). By raising your shoulders, you



FIG. 123.—"Tie hands—drag" carry.

will be able to lift his head and shoulders above the ground and drag him.

Two other methods are illustrated that may be used to carry a patient; the "two-bearer carry" and the "chair litter." (Figs. 124 and 125.)



FIG. 124.—"Two-bearer" carry.



FIG. 125.—Chair carry.

When a patient is able to assist by using one or both his arms, and does not require support for either of his lower limbs, the "four-hand" seat can be used. The hands of the bearers are locked as shown in Figure 126. The patient places his arms around the bearers' neck, and the bearers bend to allow him to sit on the seat formed by the locked hands. By raising in unison they lift the patient and are able to carry him.

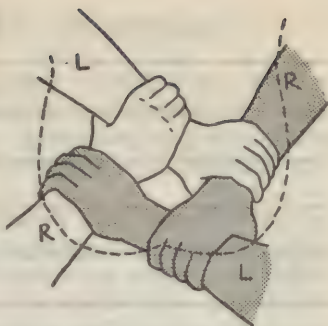


FIG. 126.—"Four-hand" seat carry.

## NOTES

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# INFLAMMATION AND INFECTION

*Inflammation* is the change that occurs in living tissue, when it is injured. It is most marked and typical in the acute form that occurs in cases of bacterial infections. Inflammation may be found in fractures, dislocations, sprains, wounds, burns, frostbite and exposures of various types.

*Infection* is produced by the entrance into, and multiplying within the body, of pathogenic microorganisms. It may be acute or chronic, local or general. An abscess is an acute, local infection, while scarlet fever is an acute, general infection. A bed sore is a local, chronic infection. Tuberculosis and syphilis are examples of chronic, general infections.

*Focal infection* is an area of infection which is or may be responsible for some distant or general disease. For example, an infected finger could be the cause of tetanus or a general septicemia.

## *Cardinal Symptoms of Inflammation*

1. Heat.
2. Discoloration (due to engorgement of blood capillaries).
3. Swelling (due to pouring out of blood fluids and cells into the injured tissues).
4. Pain (due to the pressure of pent up fluids on the nerve ends in the area affected).

These four cardinal symptoms cause an inability to perform the normal functions.

## *Constitutional Symptoms of Infection*

1. Elevated temperature
2. Increase in the number of white blood cells (leukocytosis).

These symptoms depend, in a large measure, on the cause of the inflammation and the amount of the broken down products contained in the inflamed area that is absorbed into the general circulation.

## *Causes*

1. Traumatic—blows or mechanical irritations.
2. Chemical—stings of insects, chemicals, venom of serpents and poisonous plants.
3. Thermal—heat and cold, frostbite, acid burns and immersion foot.
4. Micro-organisms—staphylococcus (under the microscope they resemble clusters of grapes) usually present in infected wounds; streptococcus (cellular masses in short or long chains) and are present in erysipelas, scarlet fever and severe burns.
5. Agencies—electricity, x-ray burns, radiation sickness (atomic ray sickness), actinic rays of sun (which excite the chemical actions of the human body).

## General Treatment

1. Remove patient from the cause. Whatever the cause may be if the patient is left near or where a complication to inflammation may become aggravated is reason enough to remove him from it. Remove the cause, if present, in or upon the body.

2. Place inflamed part at rest. Complete bed rest makes the patient more susceptible to any treatment that may be administered. Medical treatment is of no avail if patient remains active or moving about.

3. Elevation of the inflamed area, if in extremities, tends to reduce blood pressure of the affected part, eases pain, and aids in the venous flow.

4. Hot dressings act to soften the tissues and hasten the carrying away of products of inflammation, thus decreasing the pressure of nerve endings at the inflamed area. Magnesium sulfate (Epsom salts) or boric acid is usually the drug of choice.

5. Cold dressings contract the dilated blood capillaries and decrease the tension.

6. Ointment dressings soften the tissues and in addition some medicinal agent is added to rid the inflamed part of infection and to heal the wound.

## Special Types of Infection and Inflammation

An *abscess* is a localized collection of pus in a cavity formed by the disintegration of tissues. The infection contains living and dead bacteria, white blood cells, fluids, and tissue cells that are dead.

Follow the general treatment given for inflammation. After the abscess is localized and soft, and if it is not already draining, incise it. This will permit the escape of pus. However, do not allow the pus (or core) to run or touch any other part of the skin, as it is liable to spread the infection. Catch this material in a piece of sterile gauze.

A *furuncle* or *boil* is an abscess in the true skin caused by a micro-organism entering this tissue by way of a sebaceous or sweat gland and in which there is a central slough or "core."

### Symptoms:

1. Pain—due to increased pressure on nerve ends.
2. Heat—due to increased flow of blood to the part.
3. Redness.
4. Swelling.
5. Usually there is the formation of a pustule which may rupture before it has completely come to a head, often with the formation of a thin crust. In 3 or 4 days a tender base results, and on the 7th or 8th day it may rupture and drain. The "core" must be removed. This usually occurs spontaneously on the 9th or 10th day. Healing then occurs by granulation.

### Treatment:

1. Follow general treatment for inflammation.
2. Remember! DO NOT SQUEEZE.

3. Hot packs.

4. Incision and drainage when and where necessary.

5. Remember the "Dangerous Triangle." (p. 115.)

A *carbuncle* is an abscess with several "cores" (sloughs).

*Treatment:* Same as for a furuncle.

*Lymphangitis* is inflammation of the vessels that carry lymph, and is due to pathogenic bacteria. There are two types of lymphangitis:

1. Capillary—anywhere on the skin of the body.

2. Tubular—occurs usually in the skin in the extremities.

*Symptoms:*

1. Usual signs and symptoms of inflammation.

2. Often there is an early chill and temperature rises to 102° to 103° F.

3. Increased pulse rate.

4. Headache and sometimes vomiting.

5. Depending on type of lymphangitis, there may be irregular red streaks extending from the injury toward the heart.

6. Increased white blood cell count.

*Treatment:*

1. Strict bed rest.

2. Sulfadiazine (orally 2 Grams immediately, then 1 Gram every 4 hours until redness disappears. Give plenty of fluids with the sulfonamides.

3. Elevation of inflamed area, and the application of hot compresses.

4. Do not make any incision.

*Lymphadenitis* is inflammation of the lymph nodes; usually they are of the neck, axilla, elbow, groin and popliteal space.

*Symptoms:*

1. Swelling of glands.

2. Tenderness and redness.

3. Pain.

*Treatment:*

1. If no visible cause is seen have the patient see a medical officer to determine the cause—it may be due to infected tonsils, teeth, etc.

2. Hot moist dressings.

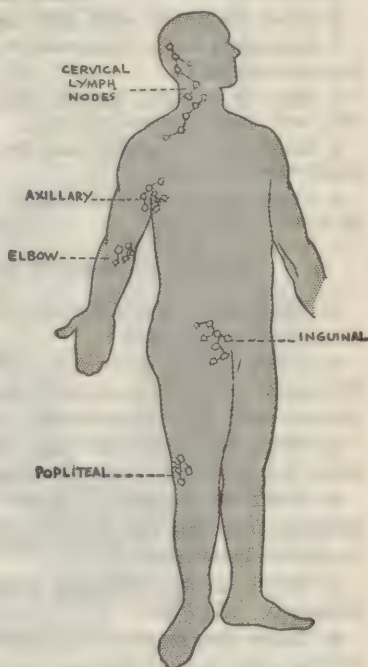


FIG. 127.—Locations of principal lymph nodes.

3. Plenty of bed rest.
4. Liberal amounts of fluids by mouth.

*Cellulitis* is inflammation of cellular tissues.

*Symptoms:*

1. Tenderness and pain.
2. Certain amount of brawny induration or hemorrhage.
3. Abscess formation (swelling).

*Treatment:*

1. Hot boric acid or magnesium sulphate dressings.
2. Incise when infection becomes localized.

An *ulcer* is an infected open sore. It is generally caused by the failure of a wound to heal properly, and may occur any place on the body surface. It is accompanied by slight pain and prostration. This may be a slight temperature or a rise to 101° to 103° F.

*Treatment:*

1. Clean frequently with zinc peroxide solution.
2. Seal entire region with vaseline gauze or zinc oxide ointment, leaving it on for 24 hours.
3. Take off dressing, irrigate with zinc peroxide or sterile saline solution, and apply another dressing.
4. Sulfanilamide powder may be dusted on locally if patient is not hyper-sensitive to it.
5. Ulcerations are usually difficult to heal and should be seen frequently by a medical officer.

### DON'Ts in Treating Inflammation or Infection

1. Don't fail to learn the four cardinal symptoms of inflammation or infection. (P. 111.)
2. Don't fail to learn the general treatment of all infections. The early recognition of an infection and treatment may save the patient days of hospitalization, a limb, or even his life.
3. Don't SQUEEZE the boil or infection, as this tends to break down the protective walls enclosing the infection and will spread it.
4. Don't let the pus or "core" touch the surrounding skin. Remember that this pus contains live bacteria and the infection can be spread by contact.
5. Don't fail to learn the proper method to make incisions for drainage. (P. 179.)
6. Don't forget the "Dangerous Triangle." That is the area between the base of the nose and both corners of the mouth. This is important because the veins in this region drain into the venous sinuses to the brain. Thus any disturbance of an infection in this

area could cause an inter-cranial venous thrombosis (blood clot) and brain infection, or the infection could enter the cavernous sinuses of the skull and cause a general septicemia. Many authorities consider all furuncles of the face as occurring in the "danger zone." Any type of manipulation or drastic local treatment is absolutely contraindicated. Adequate systematic administration of the sulfonamides or penicillin, and wet dressings are the procedures indicated in handling such cases. Complete rest, including the use of a glass feeding tube, is advocated until the acute symptoms have subsided.

7. Don't hesitate to call a medical officer for advice in treating infections or to transfer your patient to a hospital if you think the infection is a serious one.

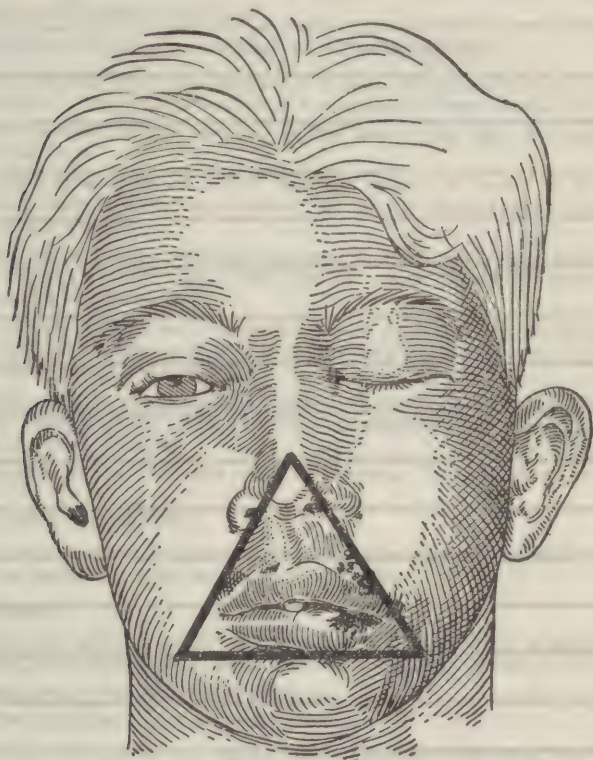


FIG. 128.—"Dangerous triangle." Inflammation or infection in outlined area is particularly dangerous. This illustrates the appearance immediately before death, owing to the fact that the lip was incised.

## NOTES

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## POISONED WOUNDS

### *Insect Bites*

Insect bites, such as those produced by mosquitos, fleas, ants, and bees, require but little treatment. The local application of a solution of baking soda or dilute ammonia water affords considerable relief.

Bites of the more poisonous spiders and scorpions are often severe and require prompt treatment. Poisonous spiders do not sting but actually bite. The poison is contained in sacs at the base of the fangs through which it is transmitted by small tubes. Scorpions occur practically all over the world and are especially common in the tropics. The stinger and venom sacs of the scorpion are located in the tail.

Symptoms of poisonous spider and scorpion bites:

1. Pain—Spider bites are usually felt as a sharp prick and the pain is not severe. However, the sting of a scorpion causes intense pain.

2. Slight swelling—The swelling at the site of the bite is usually not pronounced.

3. Shock—Symptoms of shock develop within  $\frac{1}{2}$  hour to 2 hours. Patient becomes anxious and restless. He is very thirsty and nausea and vomiting may develop.

4. Muscular cramps (Spiders)—About  $\frac{1}{2}$  hour after the spider bite painful muscle cramps begin near the bite then spread to involve the other muscles of the body.

5. Numbness (Scorpions)—Numbness and partial paralysis develop at the site of the scorpion sting, and if the sting is on the arm or leg, the part become useless for a time.

6. Death—Adults rarely die from spider or scorpion bites although they are often made very ill. The severity of symptoms depends largely upon the size of the individual.

*Treatment:* Apply ammonia water or alcohol. Watch patient carefully.

### *Spider Bites (Tarantulas)*

*Symptoms:* Abdominal pains, diffuse muscle spasms, especially in the abdominal muscles. Pain in the part involved.

*Treatment:*

1. Keep the patient quiet and, if available, wash with a solution of potassium permanganate (1:1000) outside and inside of bite.

2. Apply local tourniquet and suction.

3. Anti-venom serum as soon as possible.

**NOTE:** In the case of the "Black Widow Spider" the pain will spread quickly to the muscles of the back, shoulders, chest, abdomen and limbs, accompanied by severe abdominal muscle spasms. The spasm may be overcome by the use of calcium gluconate or magnesium sulphate administered intravenously.

## ***Human Bites***

Human bites often introduce a variety of virulent bacteria. Care must be taken to cleanse the wound. Carefully immobilize it in a comfortable position. If infection occurs, elevation, immobilization, heat and chemotherapy should be used.

## ***Animal Bites***

Animal bites are usually badly torn and dirty wounds which are likely to become infected unless careful immediate treatment is given. In addition to this usual danger of infection there is the even more serious danger of rabies. This disease most commonly occurs in dogs, but wolves, cats, goats, sheep, horses, and pigs are also occasionally infected. Animals having rabies transmit the germs through the saliva to man at the time of biting.

If rabies once develops in man it cannot be cured; therefore, prevention of the disease is of utmost importance. A preventive treatment known as the Pasteur vaccine treatment is available and is almost completely effective. When a person is bitten by an animal suspected of being rabid, it is important not only to treat the patient's wound but also to keep the animal confined and under observation. After the patient has received first-aid treatment of the bite wound, he should be transferred to the nearest naval or civilian hospital along with a complete report of the circumstances involved in the animal bite.

### ***Treatment:***

1. If possible have the dog confined for observation for rabies.
2. Wash the wound to remove the saliva.
3. Cauterize wound with fuming nitric acid or phenol. Neutralize the acid with soda bicarbonate or ammonium hydroxide solution.
4. Apply sulfanilamide and sterile dressing, or tincture of iodine if available.
5. Get patient to a medical officer for antirabies treatment.

### ***Care of the suspected animal:***

Keep the dog under observation for at least 3 weeks. If the animal has rabies it will die of the disease within 7 to 10 days. The time required for rabies to develop in man after being bitten is 3 to 8 weeks. Thus, while the animal is under observation, it is safe to wait a few days before starting the Pasteur preventive treatment. However, if the patient has been bitten on the face, the preventive treatment should be started immediately.

If the animal dies its head should be removed, packed in ice, and sent at once to a public health laboratory where a definite diagnosis of rabies may be made by examining the animal's brain.

The Pasteur vaccine treatment should be given:

1. If the animal is known to be rabid.
2. If the animal cannot be found after the biting.
3. If the animal is killed too early for a definite laboratory diagnosis of rabies.
4. If the animal develops symptoms of rabies during the 3 weeks' observation period.

### *Snake Bites*

Poisonous snakes, such as the rattlesnake, copperhead, water moccasin, coral snake, pit viper, and cobra, have teeth arranged in two rows with a pair of fangs near the fore part of the upper jaw. These fangs have either a groove or a canal through which a poison is injected at the time of the bite. Nonpoisonous snakes have four rows of teeth without fangs, and therefore the imprint of the bite will sometimes enable one to determine whether a person has been bitten by a poisonous or nonpoisonous snake (Fig. 129).

The majority of snake bites occur on the leg or thigh and therefore prevention is possible to a great extent by wearing high leather shoes or leggings.

#### *Symptoms:*

1. Pain—Severe pain develops immediately at the site of the bite.
2. Swelling—The skin around the bite rapidly becomes swollen, tender, and purplish red. Only one or both puncture points may be seen.
3. Shock—Within 15 minutes to 2 hours the patient develops weakness, nausea, vomiting, and loose, watery stools. Faintness sets in, followed by drowsiness. The skin becomes pale and sweaty, and the arms and legs are cold. The pulse is rapid and weak and breathing is labored. Muscular weakness and difficulty in swallowing and speaking gradually develop. The poisonous venom is usually absorbed slowly and therefore the symptoms of collapse and prostration often develop gradually over a period of several hours or a day. If the venom is injected into a blood vessel at the time of the bite, these symptoms occur rapidly and death may occur in a few minutes.

4. Death occurs in many untreated cases. The patient may go into a state of unconsciousness, his breathing gradually weakens, becomes slower and finally stops.

#### *Treatment:*

1. Make the victim lie down and keep quiet. Moving about and muscular exertion only spreads the poison.

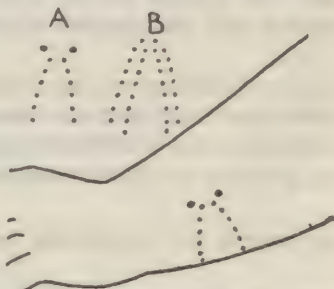


FIG. 129.—Snake bite marks. "A" indicates a bite by a poisonous snake; "B" shows a mark made by a nonpoisonous one. The mark on the arm is similar to that made by a poisonous snake.

2. Place a tourniquet around the limb just above the wound to keep the poison localized so that it can be withdrawn by suction.

3. Make a cross incision with a sharp, clean knife or razor blade over each fang mark. The incisions should be about  $\frac{1}{4}$ -inch deep and  $\frac{1}{4}$ -inch wide.

4. Apply suction as soon as possible by mouth or with a suction pump.

5. Open sores, cuts in the mouth, or gums which bleed easily may cause some danger to the person who applies the suction, but the danger is not to be compared to that of the person bitten.

6. The saliva should be spit out after sucking the wound.

7. The tourniquet should be released after 10 to 15 minutes for about a minute at a time.

8. If a heart stimulant is necessary as shown by collapse and weak pulse, give a little strong coffee or a teaspoonful of spirit of ammonia in a small glass of water. If the anti-venom serum is available, it should be used. Serum treatment alone should not be relied upon. It is much better to withdraw the poison by suction than to try to neutralize it. The serum should be for the specific kind of snakebite.

NOTE: Do not give alcoholic stimulants to a victim of a snake bite. Alcohol stimulates the circulation and may rapidly spread the poison through the body.

# BURNS

Burns are caused by exposure to electricity, bomb flash, shell flash, burning oil, chemicals, incendiary bombs or any high temperature of either dry or moist heat. Burns represent some of the most frequent and serious injuries suffered. These notes are designed to present a simple standard procedure for **EMERGENCY** or field conditions.

## *Classifications*

Burns are classified into three degrees, according to the area and depth of the injury.

1. **FIRST DEGREE:** Simple reddening or scorching of the skin. (Sunburn.)
2. **SECOND DEGREE:** Blister formation, the first layer of skin is destroyed. (Severe sunburn or open flame burn.)
3. **THIRD DEGREE:** Actual charring and destruction of the surface and deeper tissues. (Contact point of a high frequency electric burn.)

## *General Observations*

1. The seriousness of a burn depends more upon the extent and location rather than the depth. It stands to reason that a 2d degree burn that is extensive is more serious than a localized 3d degree burn. Generalized 1st degree sunburn has been known to cause death.
2. In wartime many burns are complicated by traumatic wounds bringing about complications that make the treatment more difficult. Shock is almost sure to develop, both primary and secondary.
3. Treatment should be instituted immediately to relieve pain and minimize fluid loss.
4. Treatment should be instituted immediately to prevent or lessen the danger of shock.
5. Avoid contamination where there is blister or broken blister formation.

## *Emergency Supplies Recommended*

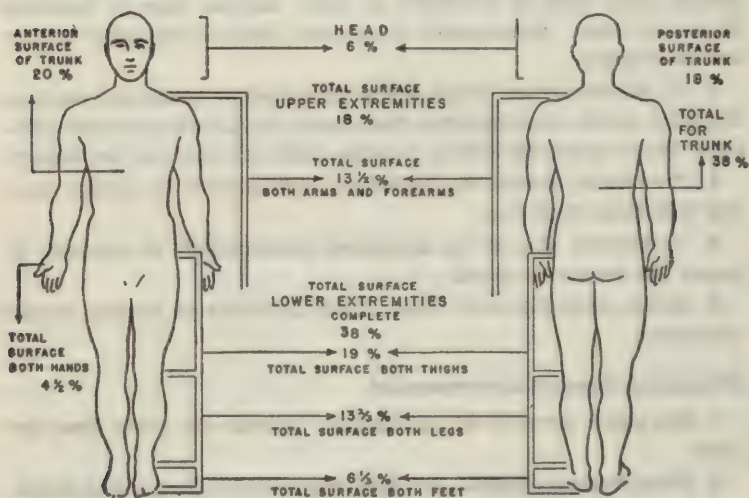
1. Morphine syrettes or hypodermic tablets— $\frac{1}{4}$  grain dose for pain.
2. Dried human plasma—for fluid replacement; to prevent shock.
3. Normal saline solution—lost fluid replacement.

4. Detergent emulsion—cleansing agent.
5. Petrolatum (sterile if possible).
6. Boric acid solution—for eyewash.
7. Butyn Ophthalmic ointment 2 percent—anesthetic. (Or mineral oil.)
8. Gauze for dressing. (NEVER USE COTTON—it adheres to the wound.)
9. Splints—for immobilization.

## RELATIVE SKIN AREAS ACCORDING TO BERKOW

ADULTS		CHILDREN	
TRUNK	36 %	TRUNK	40 %
LOWER EXTREMITIES	38	LOWER EXTREMITIES 12-AGE IN YEARS	38
UPPER EXTREMITIES	18	UPPER EXTREMITIES	16
HEAD	6	HEAD 12-AGE IN YEARS	6

## BERKOW'S METHOD OF ESTIMATING EXTENSIVENESS OF SKIN LESIONS



## First-Aid Treatment of Burns<sup>1</sup>

The first-aid man working under conditions of battle should have six objectives in mind in caring for burn casualties. In order of urgency they are:

1. Put out any fire of clothing or on skin surfaces, and flush off any corrosive chemicals with large amounts of water.

2. Prevent or treat shock.

2. Relieve pain and anxiety.

4. Keep the patient physically cool.

5. Protect against infection or further injury.

6. Prevent dehydration.

Procedures will necessarily vary with the supplies available, the number of cases to be cared for and the conditions under which first aid is given.

### *Putting Out the Fire*

Any means at hand must be used to put out fire on a man's clothes or body. Do not let him run. Pour water on him or smother the fire in a blanket or by rolling him on the deck. If phosphorus, acid, or other chemical caused the burn it must be flushed off with large amounts of water, at once.

### *Treatment of Shock*

Shock is present when no pulse can be felt or when it is very weak and rapid, and when the systolic pressure is less than 100. Pulse and blood pressure should be taken hourly if possible. Shock should be anticipated in any burn of 15 percent or more of body surface, or in smaller burns associated with other injuries or with extreme fatigue.

Estimation of body surface involvement can be made roughly as follows:

Whole trunk (anterior, posterior and lateral) from neck to pubis and upper edge of buttocks—26 percent.

One complete lower extremity (upper edge of buttocks to toes)—22 per cent.

One whole upper extremity—9 percent.

Complete head and face—7 percent.

One side of hand and fingers—1 percent.

Using a hand to estimate percentage, always visualize in terms of the patient's hand.

Shock may occur at any time in the first 2 days. In case of doubt of the presence or possible development of shock, treat the patient as though it were already present.

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<sup>1</sup> Lund, Green, and Levenson—Hospital Corps QUARTERLY, November 1945.

Albumin diluted with 4 parts of saline or plasma, undiluted, should be started first on the more severe cases. An exception is that burns of less than 60 percent should be accorded priority care, when several patients are to be cared for.

The rate of injection should be 2 liters for burns of 40 percent or more; 1 liter for burns of 25 to 40 percent and 500 cc. for burns of 15 to 25 percent in the first 6 hours of treatment. One ampule (3.75 Grams) of sodium bicarbonate should be added to the *first* bottle of fluid. If the patient is pulseless or the systolic pressure is below 100, one liter should be given as rapidly as possible using two sets and two veins and as much gravity force as possible. If no albumin or plasma is available, saline and dextrose should be given in the same dosage, with sodium bicarbonate added.

After 6 hours more albumin or plasma will probably be needed and the dose should be approximately the same as for the first 6 hours, but it is to be spread out over the next 18 hours.

If shock intervenes in spite of this treatment, speed up the flow until the day's dose is given. Another dose of 2 liters, 1 liter, and 500 cc. according to the area of burn should be given in the second 24 hours. After that, no more albumin or plasma should be given without the advice of a medical officer, as it is likely that it would do more harm than good. If no usable vein is available under unburned skin, given intravenous normal saline injections or hypodermoclysis through the burned skin for 48 hours.

### ***Immediate Relief of Pain***

After intravenous treatment has been started on all patients needing it, attention should be given to the relief of pain. Although a proper dressing does more to relieve pain in the long run, morphine is necessary and the first dose should precede surface treatment. The excessive doses formerly recommended are no longer recommended. The standard dose of  $\frac{1}{4}$  grain which is also the maximum, should be given intravenously if the man is in severe shock, otherwise subcutaneously. This should not be repeated more often than every 3 hours and must not be given to an unconscious patient. Oral sedation is useless.

### ***Physical Cooling***

Even at a room temperature of 70° F. many patients with severe burns die from 1 day up to 2 weeks with body temperatures above 106° F. This fever is frequently not due to infection and can be relieved or prevented in most cases by prompt and extreme measures to cool the patient. Such measures include removal to cool surroundings, continuous cool water or cracked ice baths to unburned areas, and at times, removal of bulky dressings.

High external temperatures enhance seriously the degree of shock and the likelihood of high fever. If a man with a severe burn is to be held for any length of time in an environment of 89° F. or more, the surface treatment may have to be completely different from the standard. Any man whose temperature reaches 103° F. or more must have 50 percent or more of body area exposed (even if some of it is burned) to ice water, or a cool breeze. If ice water is used, it must be by continuous bathing or packing of the whole exposed area. If results are not obtained in 1 hour, the exposed areas must be enlarged and the efforts doubled. If no other source of cooling is available, sea water should be used. If possible, each patient's rectal temperature should be taken every 4 hours.

### *Protection of the Surface*

No blisters should be opened and the residue of already broken blisters plus any form of dirt, grease, tar, or firmly adherent pieces of clothing should be left on the burned area. All loose clothing should be removed. From this point on two different procedures are recommended. Each is mutually exclusive and must be followed according to the indications given.

### *Procedure Number 1*

Choice of cases—To be used for all burns except those of the face, genitalia, and arms when present or expected air temperatures are 80° or less. If present or expected temperatures are 80° to 90°, this procedure is to be followed only if less than 50 percent of the body area will be covered by the dressing. (*In many cases dressings will necessarily cover more unburned skin than burned skin.*) If present or expected temperatures are 90° or over, it is to be used only if 25 percent or less of body area will be covered by the dressing.

Procedure—No ointment or chemical should be used. If no sterile dressing materials are available, use cleanest material of the same general nature as the articles described below. Take a "burn roll" and wrap firmly but not tightly around the burned area and adjacent unburned skin. Do not separate the fingers. Apply so that it is five or six layers thick at all points. Over the "burn roll," bandage evenly and firmly with 4-inch "Ace" or similar non-rubber containing elastic weave bandages for the limbs or 8-inch to 11-inch bandages for the trunk. Strap the whole dressing up with long criss-crossing adhesive tape making a network over the surface and the parallel tapes at no point being over 3 inches apart.

When finished, this dressing should not be able to slip on any motion made by the patient and should restrict, to a large extent, the motions of his joints. If there is no slipping, there is no friction

and the dressing is as comfortable as if ointment were used. The dressing must not constrict the circulation to any limb and must not be so tight across the chest or belly as to hinder respiration.

### *Procedure Number 2*

**Choice of cases**—To be used for all burns of the face, genitalia, and in the area between the genitalia and the anus and for 3 inches around the anus. Also to be used in other areas on cases where the area of the burn is too great to be covered by a dressing because of the heat as defined above.

**Procedure**—Using the hand, washed if possible, spread petrolatum about  $\frac{1}{2}$  to  $\frac{1}{8}$  inch thick over the exact area of the burn. Provide a sterile sheet for the patient to lie on. Reapply the petrolatum frequently as it gets rubbed off. Put on gauze, cloth, or other material over the petrolatum-covered burn. Use cool air, water, or ice water to promote cooling as mentioned above. If possible, promote cooling through unburned skin but if necessary, expose the whole body and all extremities even including burned areas.

### *Prevention of Dehydration*

If the patient is unconscious or unable to swallow, give nothing by mouth but give intravenous or hypodermic saline and dextrose at the rate of 1 liter every 8 hours irrespective of area burned and in addition to the fluids mentioned above for shock. Add an ampule of sodium bicarbonate or sodium lactate to every other liter given.

If conscious and able to swallow, give water by mouth in copious amounts. Add 15 grains of common salt and the same amount of baking soda to each 8-ounce glass full. Do not exceed this proportion of salt and soda. One to two glasses should be given every hour. If he vomits, it does no harm but smaller amounts of water at more frequent intervals should be tried. If nothing is retained by mouth for 4 hours or more, give intravenous or hypodermoclysis in the amounts described above for the unconscious. After the fluid in bottle is injected, try giving it orally before starting another injection.

### *Drugs Recommended for Treatment*

Penicillin is the chemotherapeutic agent of choice in the treatment of impending or established invasive infection in burns. The drug should be continued until the wounds are healed by epithelization or skin grafting. Systemic penicillin therapy should be employed; local penicillin therapy is not recommended, as concentrated solutions or applications tend to cause irritation. The sulfonamides have been abandoned in the treatment of burns

especially because of renal complications following their use. Penicillin should be administered in a dosage of 25,000 units, every 3 hours, intramuscularly.

Tetanus prophylaxis is recommended for all burn cases.

Oxygen therapy is indicated during resuscitation and for the treatment of anoxia. The positive pressure mask is contraindicated in the administration of oxygen for anoxia resulting from pulmonary edema due to the inhalation of irritant gases.

### ***Acid or Alkali Burns***

Quickly remove the clothing. An acid burn should be washed with a large volume of water at once, then with a solution of sodium bicarbonate.

Treat a carbolic acid burn with alcohol. If alcohol is not available flush continuously with water.

An alkali burn should be washed at once with water to remove the alkali and then with a weak solution of acetic acid or vinegar.

### ***Burns of the Eyes***

Single installation of 2 percent butyn ophthalmic ointment may be given for burns of the eyeball. Caution against rubbing eyes in view of the hazard of injury to anesthetized cornea. Immobilization of the eyeball is desired.

Flash burns of the eyes (caused by looking at a welding arc) though not serious, are very painful and irritating. Instillation of castor oil in the eyes, followed by bandaging or the use of dark glasses, usually controls irritation.

Chemical burns of the eyes should be flushed copiously with water. Lemon juice may be added to the water in alkali burns. Milk is also an excellent wash in alkali burns. Sodium bicarbonate should be added to the water. Get the patient to a medical officer as soon as possible.

## NOTES

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

# FIRST-AID TREATMENT FOR SURVIVORS OF DISASTERS AT SEA

## General Principles

No hard-fast rules can be laid down for the treatment of shipwreck survivors because no two cases are alike and some people can stand up under hardships better than others. Going without food and water may cause much suffering among some survivors whereas others may not suffer greatly. Some persons can withstand exposure to sun, moisture, heat and cold better than others.

Burns, broken bones, flesh wounds and the condition of shock are found often among survivors. First-aid treatment must be given immediately for these conditions. Another condition called *blast concussion injury* (in water) should be expected in survivors who have been swimming or floating in the water when a depth charge, torpedo, or aerial bomb has exploded nearby. The destructive force of such a blast is transmitted in all directions through the water and it is very likely to cause injuries of the lungs, stomach or intestines.

Because the injuries are internal, they cannot be seen and may be overlooked. However, there are certain symptoms you should watch for and be ready to take immediate action when they appear. Shock may be the first and only symptom, or it may develop after the appearance of other symptoms. If the lungs are injured, the victim will have difficulty in breathing. He may spit up or cough up frothy blood. With injury to the stomach and intestines, the victim will complain of pain in the abdomen. Later, due to the severe internal inflammation, you may find that the belly is swollen or very firm and unyielding. It may feel rigid and board-like when you put your hand on it.

### *Blast Concussion Injury*

The first-aid treatment of these conditions due to blast should be given immediately. The victim should be made to lie down with his head low and he should be kept warm. If you have morphine syrettes, give him sufficient morphine to relieve his pain and keep him comfortable. Water or other fluids may be given if thirst is severe. If you suspect that an internal organ has been ruptured or that there has been internal hemorrhage, there is all the more reason for getting him medical attention promptly.

In the case of victims who are breathing hard and coughing blood, prop them up in a half sitting position and use morphine in small amounts only. Give only one-half the contents of a syrette.

## ***Effects of Exposure in Open Boat***

Survivors who have been at sea in an open boat or raft for several days or weeks usually will be suffering from one or more of the following conditions:

1. Extreme thirst.
2. Starvation (malnutrition and under-nutrition).
3. Painful and swollen feet ("Immersion foot").
4. Frostbite and effects of prolonged exposure to cold.
5. Sunburns.
6. Inflammation of eyes caused by sun glare, oily water, or exposure.
7. Mental disturbances.

## ***Carrying and Handling of Survivors***

The survivors should be carried from the boat or raft if possible, and no avoidable exertion should be allowed unless you are sure that there are no serious injuries and that the general physical condition is reasonably good. A good rule to follow is to keep the survivors lying down with the head low and the feet raised. After carrying them to a dry and fairly warm place, remove all clothes, but be very careful to handle the legs and feet as gently as possible. Survivors should be warmed up, but never put a hot water bottle or any direct heat against their feet or legs, because permanent damage may result if they have a condition known as "immersion foot." Don't place survivors near a radiator, stove, or anything hot. Keep your patients at rest in a warm bed until all signs of exhaustion, shock, and mental distress have cleared up.

## ***Examination of Survivors***

You must examine each survivor carefully for injuries, burns, frostbite, swelling, numbness, paralysis, and unusual tenderness of any part of the body. Ask about pain in the arms and legs.

After you have made the survivor as comfortable as possible, and if his condition permits, ask him how many days he has spent in an open boat and what the weather was like and if he was injured or sick. Don't forget to ask if he was swimming in the vicinity of an underwater explosion. Find out how much water and food he had and what kind of food rations were at hand. Ask him if he has taken any sea water to drink.

## ***Removal of Oil From Skin***

Shipwreck victims often are covered with a heavy coating of dirty oil. This happens when a tanker is torpedoed and survivors are forced into oil covered water. The oil can be removed by using another oil such as castol oil, mineral oil, lard, clean Diesel

oil, or other light oil as a wash and following it by the use of soap and water. On board naval vessels and in naval shore stations a special preparation called "Hypex" is used for this purpose. Also a 5 percent solution of "Dreft," "Drene," or "Orvus" can be used to remove oil. These are the trade names for several commercial cleansing agents. Soap and water must be used afterwards.

If the survivor is covered with a dirty coating of oil, some of it usually gets in his eyes. This causes an eye inflammation. Oil that gets in the ears may cause earache. It can be relieved by gently flushing the ears out with lukewarm water. Oil that is swallowed may cause vomiting, diarrhea and abdominal pains. These symptoms disappear quickly with rest in bed and a diet of only soft or liquid foods.

### ***Sores on Body, Legs, and Feet***

Survivors who have suffered from severe exposure may have small sores like boils or ulcers, covering all parts of the body that are not protected by clothing. Carefully clean the dirt from the skin and remove the crust from the sores. Treat the sores with an antiseptic. Do not touch the sores on the feet or legs if the condition known as "immersion foot" is present. You will know how to recognize it after reading its description below.

### ***Pressure Ulcers and Bed Sores***

Among those who have suffered greatly from starvation, extreme weight loss and emaciation will occur. Pressure ulcers or bed sores may develop from prolonged contact and pressure of the skin against hard surfaces such as thwarts and boat bottoms. Protect the ulcers against further pressure and contact with clothing or bedding by using cotton rings or pads. Do not put the support or padding directly on the ulcer or the surrounding inflamed area. Change the position of the patient frequently by turning him. Cleanse the inflamed areas daily with alcohol and dust with antiseptic powder. Keep the areas clean and dry and do not apply a dressing.

### ***Care of Survivors Suffering From Extreme Thirst***

If the victim has been exposed for a long time and has not had enough water, he will be suffering from extreme thirst. Except for shock and serious injuries, extreme thirst causes the greatest suffering and the most deaths among survivors. The treatment of starvation is not important when survivors are dying of thirst.

Without food the average man may be expected to live for about 21 days if he has water to drink. If he gets less than one pint of water per day, and provided he gets no moist food, he will suffer

from thirst after a few days. However, survivors have been known to live for 10 days or more on as little as two or three ounces of water per day without causing any apparent bodily damage. The amounts of water and food needed by a survivor depend upon weather conditions, physical exertion and individual resistance.

Thirst may be so severe that it causes unconsciousness or extreme shock. Don't give water by mouth in cases of this kind. They should be treated for shock. After recovery from shock, they can usually take small amounts of sweetened water by mouth. It is best not to give alcoholic stimulants to survivors who are in need of water.

### *Treatment of Extreme Thirst*

Do not try to give fresh water or salt water through a rubber tube or other device inserted into the rectum. If shock or unconsciousness cannot be overcome, the immediate attention of a medical officer is necessary. Great loss of weight, high fever, very fast pulse, convulsions and being unable to urinate are symptoms which show that there is serious damage and that prompt medical attention is needed. In most cases, however, small amounts of water can be taken by mouth immediately. If severe thirst is present and there is difficulty in swallowing, a few ounces of water with sugar added should be given every 2 hours and the amount should be gradually increased. Use about a teaspoon of sugar to a glass of water. Usually these cases are also suffering from starvation and the feeding of soft and liquid foods will help in providing water. If moderate thirst is present, it is treated by giving the victim all the water he can comfortably take and as often as he likes. Zinc oxide ointment may be used to treat the lips when dryness has caused cracks and sores.

After the water balance of the body has been brought back to normal, the survivor's feet and legs may swell. This swelling may be due to "immersion foot," lack of vitamins in the diet, or lack of meat and other proteins in the diet. Keep the victim's feet raised above the level of the body until the swelling subsides.

Do not give any of the sulfa drugs until the survivor has had enough water to overcome his thirst. If his thirst is extreme, this may take several days.

### *Starvation*

Most of the survivors after long exposure are suffering from starvation. The effect of starvation is much like that of severe thirst. It may be so severe that unconsciousness or shock will result and no attempt to give food or water by mouth should be made until the shock has been treated. Usually the victims have

lost a great deal of weight. They may have fever and breathing may be shallow and fast. Keeping them at rest in a warm bed is of the greatest importance in treating both starvation and extreme thirst. If they have trouble in swallowing, dry mouth, and difficulty in urinating, you must treat them for thirst before giving soft or solid foods.

### ***Feeding a Starved Survivor***

In general, the feeding of starved victims is like feeding a person who is just recovering from a serious illness. Give them small amounts of easily digestible foods at frequent intervals. For stimulants, give hot tea or coffee with sugar added. Victims who have been starved for 3 weeks or more and those who have been on a poor diet before shipwreck will usually need vitamins. To supply vitamins and fluids, give sweetened fruit juices (fresh orange juice, fresh lemonade, and canned grapefruit juice). The juice from ordinary canned tomatoes may be given and is usually less apt to cause an upset stomach than tomato juice cocktail.

### ***Effects Produced by Lack of Vitamins***

Extreme lack of vitamins often causes sore mouth, swollen and bleeding gums, ulcers of the eyes, skin troubles, and swollen legs and arms. The sores in the mouth may be very troublesome, causing ulcers and difficulty in eating. Concentrated vitamins (of the kind that contain several vitamins including vitamins B and C) should be given. Two or three times the usual daily dose should be given. Remember that the lack of vitamins is more apt to cause trouble in warm and tropical climates. If you do not have vitamin pills, the treatment for starvation which is described below will help until the victims get medical attention.

On the first day of treatment, give either fresh milk, condensed milk, or canned evaporated milk. Water must be added to the canned milk so that it has about the thickness of fresh milk. Sugar should be added to the fresh milk and evaporated milk, but it need not be added to sweetened condensed milk. Do not give cream or greasy foods for the first few days. Clear soups and broths are good if they do not contain much fat. Gruel, such as oatmeal, cream of wheat, or other well-cooked cereals with sugar and milk added are good. Usually on the second day toast and bread can be added to the victims' diet, and by the third day regular full well-balanced meals can ordinarily be given.

### ***Nutritional or Famine Edema (dropsy)***

A condition known as nutritional or famine edema (dropsy) may be seen in victims who have been starved for a period of 2 months

or more. It is a result of not getting enough meat and other protein foods. In addition to the starved appearance, there is a swelling of the feet, legs, hands, and arms. To treat such cases give foods having a high protein content, such as eggs or meat. At first, give egg drinks and broth or soups. Try to get such cases under medical attention as soon as possible because they usually need hospital care.

### ***Bowel Movements***

Survivors who have been on small food or water rations or without food or water for several days often become alarmed because they have few or no bowel movements. This is to be expected and no first-aid treatment is necessary. However, if desired, for such cases an enema may be given for the treatment of constipation.

### **Immersion Foot**

If a survivor has been sitting in an open boat for a long time, his feet are often cold and wet. Actually they may have been immersed in icy water in the bottom of the boat. This causes "immersion foot." It may develop even though the victim has been wearing shoes or boots. Usually the first thing noticed is painful feet, and then a few days later the feet and legs begin to swell. The clinical aspects of the affected area go through four stages: exposure, prehyperemic, hyperemic, and posthyperemic. After a time, discoloration of the skin appears and blood or water blisters, ulcers, and even death of the tissues may occur. The feet feel numb and they may become paralyzed. Numbness and tingling sensations may be felt in the arms and hands (immersion, hand).

### ***First-Aid Treatment***

First-aid treatment for "immersion foot" is very important because the vitality of the legs and feet has been lost and the tissues are easily damaged. With treatment the circulation of blood in the legs and feet is improved, but remember that too rapid a return of circulation may cause severe pain and further damage. Be very careful in handling the limbs while numbness is present to keep from injuring the flesh.

The most important first-aid measures are avoidance of weight-bearing, the warming of the patient—but *not the extremity*—and the prevention of secondary infection by sterile precautions. Early treatment is based on the principle of keeping tissue metabolism in

the affected part at a low level. This is best done by bed rest with the extremities elevated on pillows. The extremities should be kept at room temperature (70° F.) until the edema has subsided.

A continuation of pain may make a lower temperature mandatory. This may be accomplished by use of a fan set to blow over the exposed extremity, or by the actual packing of the extremity in ice. The use of penicillin and tetanus toxoid is indicated in all instances.

Never put direct heat on a foot or leg of a victim suffering from "immersion foot." Massage is harmful and the legs should not be washed and antiseptic should not be used. Place the injured limb or limbs in dry cotton or wool and keep them cool. Don't apply any tight dressings or bandages because they may stop the circulation. You may have to keep up the treatment several days or weeks before the symptoms of "immersion foot" disappear. As long as there is paralysis or swelling or pain, the patient should not be allowed to walk and the treatment should be kept up.

### **Prolonged Exposure to Cold and Frostbite**

General cold injuries result in death when the body temperature (rectal) drops to 75° to 80° F. Treatment consists in warming the body as rapidly as possible. Hot tub baths, pouring hot water over the exposed person or placing him in a hot shower are methods of rapid rewarming. The water should be kept between 110° and 120° F. The patient should be rewarmed until his rectal temperature reaches 94° F., at which time he may be rewarmed more slowly. Oxygen inhalation is the only other treatment permitted. Stimulants, alcohol, and massage may be harmful.

Frostbite is the freezing of single parts of the body—most often the nose, ears, cheeks, fingers and toes. Frostbitten hands or feet are usually very painful in the hyperemic stage. Frozen ears, cheeks and nose are not painful and the victim usually does not realize they are frozen until someone notices the color change and tells him about it.

In thawing out frozen parts of the body, never use heat. If the parts thaw too fast, pain and swelling result. The skin may peel off leaving a raw surface and there is danger of infection.

In first-degree frostbite, sometimes called chilblain, the skin is a dark red color and the part is painful. In second-degree frostbite, the skin is bright red and there are blisters. In third-degree frostbite, the frozen part is pale, stiff, and brittle.

## ***Treatment***

Treatment should be started by putting cold cloths on the frosted part. Do not rub snow or ice on it. The injured part has to be kept cool and should be elevated above the rest of the body. Cooling to room temperature (65° to 70° F.) is usually sufficient. If there are blisters, do not open them. Stop this treatment when the skin color is normal again and apply boric acid ointment to the injured areas. Parts that are dead as a result of third-degree frost-bite will, of course, not improve with treatment, and gangrene (death of the tissues) will set in. Cases like this need medical attention as soon as possible.

## **Sunburns**

Sunburn of survivors can be very serious and deaths have resulted from it when large areas of the body have been burned as a result of scanty clothing. Exposure in an uncovered boat or raft can cause sunburn even under a cloudy sky. A well-tanned skin does not always protect against sunburn.

### ***Moderate Sunburn***

First-aid treatment for sunburn is the same as for any burn. For moderate sunburn where the skin is reddened and very small blisters appear, use a burn ointment such as boric acid ointment. Use zinc oxide ointment in cases where the skin has begun to crack and peel.

### ***Severe Sunburn***

For more severe burns where large blisters are present, apply boric acid ointment and cover with sterile gauze. If boric acid ointment is not available, use vaseline. Be careful not to open any blisters that have not already broken. Usually fever is present in cases of this kind and in cases where large areas of the body are moderately sunburned. Feverish patients should be kept in bed and drinking water and other fluids should be plentifully given.

## **Eye Inflammation**

Eye inflammation often occurs among survivors. It may be caused by exposure to wind, cold, or salt water; another kind called reflection blindness is caused by exposure to sunlight or sun glare reflected from water, snow, or ice. Eye inflammation is also caused by oil that may get in the eyes when survivors have to swim in oil-covered water.

## Symptoms

The symptoms of eye inflammation are about the same whatever the cause. Where oil is the cause, the eyes look oil stained and dirty. Eye inflammation causes the eyes to be red, bloodshot, overflowing with tears, sometimes painful, and there is often a sticky crust on the lids. Looking at a bright light is usually painful to the victim.

## Treatment

Use a 2 percent boric acid solution to wash out the eyes. The solution should be dropped in the eyes using an eye dropper or medicine dropper. Cold compresses (ice bags or cloths wrung out of cold water) should be placed over the eyes for 10 minutes out of every hour that the eyes are painful. Don't use the cold compresses if there are ulcers in the eyes, but get medical attention as soon as possible. If you have a supply of clear, clean, mineral



FIG. 130.—Method of everting the lower eyelid to wash out the eye.

oil on hand, use a drop of it in each inflamed eye three or four times per day. Use an eye dropper or medicine dropper to drop it into the eyes. Do not put any bandages or covering over the eyes. Have the victim wear dark glasses until the inflammation has disappeared.

## Mental Disturbances

Mental disturbances are common among survivors as a result of their severe hardships. Such complications are most often seen in victims of middle age or older who are in poor physical condition.

**Fatigue and exhaustion cause nervousness or depression. When victims are rescued they may be so happy and excited that their minds are temporarily unbalanced. Survivors may become boisterous and very excitable or they may be so depressed that they appear to be unconscious.**

### ***Treatment***

Survivors must be reassured that "everything is all right," and that there is nothing to fear. Mental disturbances usually clear up with rest and with treatment for the other conditions described in this guide. You may have to give mild sedatives such as phenobarbital or bromides to help the victims relax and sleep. Rest in bed in a quiet room and sedatives should be provided for several days or weeks when the mental condition is especially serious and slow to improve.

## NOTES

## This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

## UNCONSCIOUSNESS

*Unconsciousness* is a loss of consciousness: It may be partial (stupor) or complete (coma). The most important thing to determine: IS THE PATIENT BREATHING OR NOT? Unconsciousness—when breathing may be caused by many injuries, diseases or poisons. The most common are:

1. Compression of the brain (head injury or apoplexy (stroke)).
2. Shock.
3. Alcoholism.
4. Head injuries.
5. Epilepsy.
6. Drug poisoning.
7. Narcotics.
8. Fainting.
9. Kidney disease.
10. Diabetes.

Due to the difficulty in determining accurately the cause of unconsciousness, only brief descriptions of the various conditions have been given. Detailed descriptions would only be confusing in time of an emergency. However, general instructions and procedures of what to do and how to handle an unconscious person have been listed.

*General treatment:* When a person is unconscious but breathing:

1. Lay the patient flat, face down, with the head turned to one side. In this position he will not choke on any vomitus or secretions.
2. See that there are no foreign bodies in the mouth, and that the air passages are clear. Remove any dentures to prevent choking.
3. Keep the patient warm.
4. Give no fluids or medications.
5. Send for a medical officer.

*Try to discover the cause:*

1. Check for hemorrhage and notice the type of respiration.
2. Is there any evidence of poisoning? Look for burns of the mucous membrane of the lips or mouth.
3. Has he a head injury?
4. Check the pulse for rate and quality. If it is rapid, weak, and irregular, and there is no obvious bleeding, it may be an internal hemorrhage. If the pulse is slow, full and bounding, it is suggestive of a "stroke" (apoplexy).
5. Smell his breath—get the odor and character. Is it alcoholic? A sweetish odor may be diabetes. A urinous odor suggests uremia—a kidney disease.
6. Noisy, stertorous breathing, and "lip blowing" suggests apoplexy.
7. If he has dyspnea (shortness of breath) he may have a heart or lung condition.

8. Check the pupils of his eyes. If they are unequal he may have intracranial pressure. If they are pinpoint, it suggests an overdose of morphine.

9. Is the body pale, cold, moist, hot, dry, flushed, or cyanotic? Are his muscles rigid or placid?

10. If he has vomited, often the contents may reveal hemorrhage or poison.

11. Ask if any witness saw what happened.

*Asphyxia* is unconsciousness with the absence of respiration. This condition requires immediate first-aid measures to prevent death. The most common causes are:

1. Drowning.
2. Electric shock.
3. Poison gases.
4. Choking.
5. Strangulation.
6. Drugs.

*Emergency treatment:*

1. Remove the patient from the source of injury or the source from him.

2. Search the mouth and pharynx for the presence of a foreign body. Make certain the tongue does not interfere with breathing.

3. Start artificial respiration at once. Keep up until breathing is well established and regular.

4. Give nothing by mouth.

*Artificial respiration* is the means of mechanically promoting breathing movements in a person who has ceased to breathe spontaneously. Even though the victim has stopped breathing, his heart usually continues to beat for some time, and because of this fact the victim's life may be saved if breathing can be resumed before the heart stops.

Natural breathing may be restored after it has stopped by promptly applying artificial respiration. The purpose of artificial respiration is to force breathing. Pressure on the victim's chest forces air out of the lungs. Release of pressure lets the lungs expand and draw the air in. Thus air is kept moving in and out of the lungs so that the body can get the necessary oxygen to keep alive. If artificial respiration is started soon enough and kept up long enough, the heart will continue to beat and the victim will start normal breathing again.

If breathing stops, begin artificial respiration at once. Every second counts—waste no time. Do not take time to examine the patient and loosen clothing. Let the assistant do that. The most important thing in giving artificial respiration is to **GET STARTED AN ONCE**.

Resuscitation should be carried on at the nearest possible point to where the patient received his injuries. He should not be removed from this point until he is breathing normally of his own

volition, and then moved only in a lying position. Should it be necessary, due to extreme weather conditions, to move the patient before he is breathing normally, resuscitation should be carried on during the time he is being moved.

Continue artificial respiration without interruption until normal breathing is restored, if necessary, 4 hours or longer. Even though the victim appears dead, do not give up. Remember that the usual tests for death, such as absence of heart beat and pulse, are not acceptable for these cases.

Beginning recovery is indicated by a slight catch of the breath or sigh. Breathing gradually becomes deeper and more regular and the operator should attempt to time his compression of the chest with the breathing efforts of the patient. Discontinue artificial respiration after the patient is breathing regularly; however, watch carefully and be ready to resume artificial respiration if the breathing stops.

In carrying out resuscitation it may be necessary to change the operator. This change must be made without losing the rhythm of respiration. The relief operator should kneel beside the one giving the artificial respiration with the operator astride one leg of the patient and the relief astride the other leg. The relief then goes through the motions until he has established exact rhythm with the operator, when he takes over from the first operator. By this procedure no confusion results at the time of the change of operators, and a regular rhythm of pressure and release of pressure on the patient's thorax is kept up.

As soon as artificial respiration has been started and while it is being continued, an assistant should—

1. *Keep the patient warm.* Without interrupting artificial respiration cover the victim with blankets or coats, and if hot water bottles are available, place them alongside the body. **DON'T LET THE PATIENT DIE FROM EXPOSURE.**

2. Examine the victim's mouth and wipe away the sticky mucous or saliva which frequently blocks the exchange of air through the mouth.

3. Loosen clothing about the victim's neck, chest, and waist.

After the patient revives, treat for shock.

1. Keep patient warm with blankets, and give warm liquids such as coffee or tea.

2. Keep patient lying down.

3. Keep patient quiet—his heart is dangerously weak.

4. Move to the sick bay as soon as possible.

Three methods of artificial respiration are given. Although the Schaefer method is the most popular, all three have their place in resuscitation. The Eve method is simple and less tiring. The Silvester method is best for short and stout people as well as for pregnant women.

## *Schaefer Method*

1. Lay the patient front side down, one arm extended directly beyond head, the other arm bent at the elbow and with the face turned outward and resting on hand or forearm, so that the nose and mouth are free for breathing.

2. Kneel, straddling the patient's thighs with your knees placed at such a distance from the hip bones as will allow you to resume the position shown in Fig. 131. Place the palms of the hands on the small of the back with fingers resting on the lower ribs, the little finger just touching the lowest rib, with the thumb and fingers in a natural position, and the tips of the fingers just out of sight around the sides of the chest wall.

3. With the arms held straight, swing forward slowly, so that the weight of your body is gradually brought to bear upon the patient. Your shoulder should be directly over the heel of your hand at the end of the forward swing. Do not bend your elbows. This operation should take about 2 seconds.

4. Now immediately swing backward, so as to remove the pressure completely and suddenly.

5. After about 2 seconds repeat the operation. The movement of compression and release should take about 4 or 5 seconds; this should be done at the rate of about 12 to 15 respirations per minute. To help in keeping a regular pace, count slowly. On the forward stroke, count, "one, two, three." On the backward swing count "one, two."



FIG. 131.—First position for resuscitation by the Schaefer method. On the opposite page (Fig. 132) are shown successive positions during the operation.

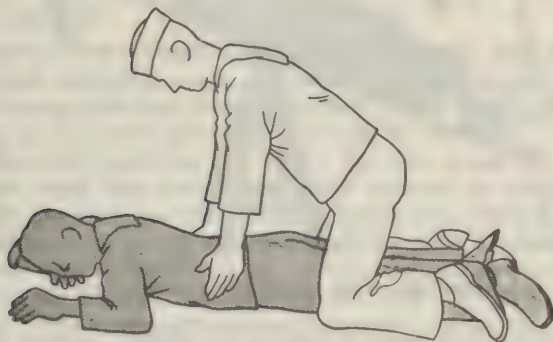


FIG. 132.—Schaefer method of resuscitation.

### *Eve's Method*

When the body is tilted head-downward, the abdominal organs slide against the diaphragm and compress the lungs expelling air. When the head is raised and the feet tilted downward, the abdominal organs slide back, drawing the diaphragm down; this causes air to be drawn into the lungs.

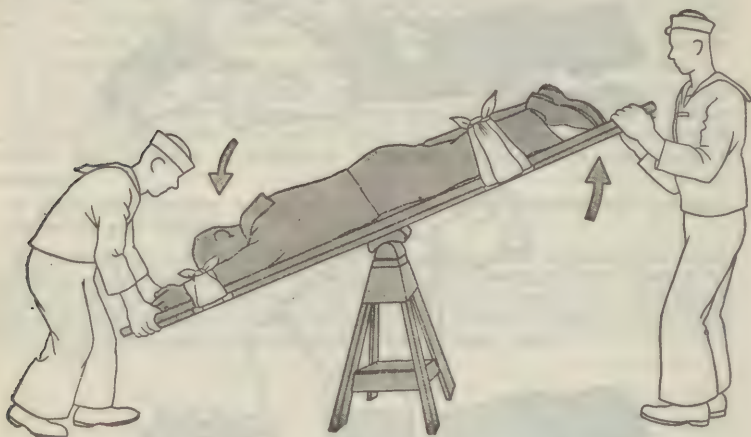


FIG. 133.—Eve's method of resuscitation.

The procedure consists of rocking the patient, securely lashed to a stretcher or board, over a fulcrum. (Fig. 133.) It is the method which has been adopted by the British Navy and has several advantages:

1. It is easier on the patient.
2. It is the least trying to the operator.
3. It requires less skill.
4. Eve believes this method has an important effect in restoring circulation.
5. The method is especially suited to patients with carbon monoxide, barbiturate or morphine poisonings or with respiratory paralysis associated with poliomyelitis. The disadvantage is that some apparatus is required.

A stretcher or board may be adapted to this purpose by fixing underneath the center a pair of grooved wooden blocks to prevent slipping. In an emergency, of course, the curved blocks may be omitted.

The patient is placed face downward and the ankles and wrists lashed to handles of the stretcher or the ends of the board. The

Schafer method of respiration must be used while these preparations are being made. In resuscitating a drowned person the first head-down tilt of 45 degrees is maintained to drain any water from the stomach and lungs. The stretcher is then rocked at a rate of 10 double rocks a minute with a tilt of 45 to 50 degrees. After a few minutes usually a tilt of 30 degrees each way will be sufficient to ventilate the lungs.

Eve describes a way in which his method can be used for a few minutes in the absence of apparatus or while it is being put together. This consists of placing the patient prone on the four flexed forearms of two men standing up facing each other and gripping each others hands. By swaying from their hips, these two men can rock their patient about 12 times a minute through an angle of 40 degrees each way.

### *Silvester Method*

Two operators are usually needed for this method. Lay the victim on his back and place a big pad under his shoulders so that his head will hang back just clear of the deck. This will let the tongue fall back on the palate instead of blocking the pharynx.

The operator kneels at the head. He then grabs the victim's arms just below the elbows, and leans forward to compress the chest with the folded arms. This operation takes about 2 seconds. Next he draws the patient's arms straight back till they are parallel beside the victim's head and as near the ground as they will go. This pulls up the ribs and opens them, and the chest cavity is enlarged. This movement requires 3 seconds. (Figs. 134 and 135.)



FIG. 134.—First step of Silvester method of resuscitation.



FIG. 135.—Second step of Silvester method of resuscitation.

This method is very tiring for one person. With one operator to work each arm, it is much easier.



FIG. 136.—Method of resuscitation on a life raft.

## DON'TS IN DROWNING CASES

1. Do not roll the victim over a barrel or similar object.
2. Do not "jack-knife" the body, or hold the victim upside down in an effort to get water from the lungs. It is much more important to get started at once giving artificial respiration. Usually there is little or no water in the lungs anyway.

## OTHER CAUSES OF UNCONSCIOUSNESS

### *Compression of the Brain*

The cause of a compression or pressure on the brain is either due to trauma (see skull fracture) or is the result of a stroke (apoplexy). In apoplexy a blood vessel in the brain ruptures with resultant hemorrhage. As the hemorrhage increases so does the pressure.

#### *Symptoms:*

1. Unconsciousness (face may be red or ashen).
2. Loud snoring type of breathing with "lip blowing."
3. Pulse slow and strong.
4. Pupils of eye unequal and do not react to light.
5. Blood pressure changes.
6. May have vomiting.
7. Patient may go into shock.

#### *Treatment:*

1. Lay the patient on his back with his head slightly elevated.
2. Give no stimulants.
3. Keep patient quiet.
4. Treat for shock.
5. Transport to hospital.

### *Concussion of the Brain*

This is a severe jarring or shaking of the brain as the result of a fall or blow.

#### *Symptoms:* (Vary according to the degree of injury.)

1. History of injury.
2. Headache and dizziness in mild cases.
3. Persistent headache, mental confusion and dizziness in the more severe cases.
4. Shock.
5. Nausea and vomiting.
6. Unconsciousness.

The treatment is the same as for compression of the brain.

## ***Epilepsy***

The patient usually utters a cry, falls suddenly unconscious, has convulsions, foams at the mouth, and bites his tongue. After convulsions cease, he passes into a deep sleep and remains in that state for several hours. When the patient has a mild form of epilepsy it is called "Petit Mal," while the more severe form is called "Grand Mal."

### *Treatment:*

1. Prevent injury to the patient during a seizure.
2. Put something between his teeth so that he cannot bite his tongue. A piece of wood, or a tongue blade wrapped with a handkerchief is suitable. Remove any dentures.
3. Keep watching the patient while he has convulsions. Do not use restraints.
4. A man known to have epilepsy should not be retained aboard ship.

## ***Fainting***

***Fainting*** results from diminishing of blood in the brain. The patient gets paler and paler, there is a sinking feeling, and he falls unconscious.

### *Treatment:*

1. This often can be prevented by placing the patient in a chair with his head forward between his legs, lower than his hips.
2. If fainting has occurred, lay the patient flat on his back with feet elevated. Loosen his clothes and give him plenty of fresh air. A little ammonia held under his nose will often revive him.

## ***Acute Alcoholism***

This is caused by the over indulgence of alcoholic beverages. Usually there is the alcoholic odor on the breath and the patient can be, in most cases, aroused. The breathing is stertorous as in a deep sleep and the pupils equal in size. The pulse is unusually strong.

### *Treatment:* (Varies with the extent of intoxication.)

1. Bed rest—warmth for mild cases.
2. Treat for shock in severe cases.
3. Examine for any body injuries.
4. Be sure he is not poisoned with wood alcohol. See "Poisons."
5. Hot coffee can be given as a stimulant.

## NOTES

## NOTES

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

## EMERGENCIES OCCASIONALLY ENCOUNTERED

The most common, serious, acute abdominal conditions are acute appendicitis, perforating ulcers of the stomach or duodenum, intestinal obstruction, gallstone colic, kidney stone colic, and poisoning by infected food or by other poisons. Pain and tenderness in the abdomen, general or localized or both, nausea and vomiting, and more or less shock are symptoms common to these conditions. All cases presenting symptoms of abdominal pain or nausea and vomiting, particularly when associated with more or less shock, should be brought under the care of a medical officer as soon as possible. If the patient will be seen by a medical officer within a few hours, morphine should not be given. If no medical aid is available and the pain is excruciating, one-half of one morphine syrette may be given, but should not be repeated for another 3 or 4 hours.

One always should suspect more than ordinary indigestion or constipation if there is much prostration, shock, or elevated temperature, or if the symptoms persist for any length of time. Many a person suffering from acute appendicitis or obstruction of the bowel will ascribe the condition to something that has been eaten; do not be deceived by such a statement. Get all the information possible as to how the attack started, history of previous attacks, and symptoms prior to the present attack. Ask whether the patient has vomited blood or not, and when the bowels last moved; take the temperature and pulse rate; lay the patient flat with the abdomen bared and determine by gentle and careful palpation where the pain and tenderness are most marked.

In cases of persistent vomiting, accompanied with abdominal pain or distension, never hesitate to insert a Levine tube into the patient's stomach and establish drainage. By keeping the stomach empty and by decompressing the abdomen, you will ease the patient's distress and you may save his life.

When on independent duty and in doubt as to a diagnosis, do not hesitate to contact your commanding officer, in order that he may obtain proper advice from a medical officer on another ship or station.

### Appendicitis

*Appendicitis* is an inflammation of the appendix. With the onset of the attack the patient frequently complains of distress in the upper abdomen, associated with loss of appetite, nausea and constipation. Sometimes vomiting and diarrhea are also associated

with it. As a rule, the pain starts in the pit of the stomach, then becomes generalized over the abdomen, and finally after several hours, becomes localized in the right lower quadrant, with marked tenderness on pressure.

A good method to find the localization of tenderness is to have the patient close his eyes and, with his index finger, point to that part of the abdomen where he feels the most pain. There is also an increase in the white blood cell count and the temperature may be subnormal from mild shock, or be elevated to 100° to 101° F. In acute appendicitis, the danger lies in its rupture with resulting peritonitis.

### *Treatment*

1. In case of any abdominal pain, **DO NOT GIVE A CATHARTIC.**
2. Get the patient to a medical officer as soon as possible.
3. Keep the patient in bed in Fowler's position.
4. Give the patient **NO opiates**, if a medical officer will be available in a few hours. If one will not be available, give  $\frac{1}{4}$  grain morphine every 3 or 4 hours, but watch your patient carefully that the opiate doesn't mask the symptoms.
5. Give sulfadiazine, 4 Grams (or grains 60) by mouth as an initial dose and then 1 Gram (or grains 15) every 4 hours. Fluid intake and an adequate flow of urine are essential when the sulfonimides are being administered. If the administration of the intravenous or subcutaneous fluids is not feasible, water must be given by mouth. Water by mouth stimulates peristalsis. This undesirable effect, however, can be greatly lessened, by frequently administering cool water in small quantities.
6. Give nothing by mouth, except as mentioned above.
7. Give fluids intravenously or subcutaneously as required to prevent tissue dehydration and to keep an adequate flow of urine (use normal saline or 5 percent dextrose).
8. Place a hot water bottle (half filled) or an ice cap—whichever is the most comfortable, over the right lower quadrant of the abdomen to aid in the relief of muscle spasms.
9. Many cases will respond to this treatment without emergency surgical intervention.
10. Never hesitate to call a medical officer or to transfer your patient if he has these symptoms.
11. If no medical officer is available, give penicillin according to the following directions: 200,000 units every 3 hours until seen by a medical officer.

### *Acute Intestinal Obstruction*

In this condition a loop of bowel becomes constricted, resulting in the inability of the intestinal contents to move beyond the point of constriction and cutting off the blood supply to the loop of the bowel with resulting gangrene or death to that section of the bowel.

This condition is followed by absorption of poisons from the intestine, peritonitis, and death if the condition is not relieved. Two very common ways for the bowel to become constricted are by means of adhesions within the abdomen and by a loop of bowel becoming strangulated in a hernia, or rupture as it is commonly called.

*Symptoms:*

1. Inability to pass gas or feces by the rectum.
2. Pain in the abdomen.
3. Vomiting (becoming more and more frequent).
4. Intense shock.

The bowel will be distended above the point of constriction and be flat below that point. The bowel must be relieved of its constriction or death will ensue.

*Treatment:*

Place the patient under the care of a surgeon at the earliest possible moment. In the meantime, take the following measures:

1. If the obstruction is due to a strangulated hernia, and the case is an early one, put the patient in a hot tub with the thighs flexed in order to relax the inguinal ring, and exert gentle pressure over the swelling;
2. Put the patient to bed, give a soap and water enema, and nothing by mouth. Never give a person suspected of suffering from obstruction of the bowel a cathartic. Always insert a Levine tube to relieve distention and vomiting.

*Perforated Gastric or Duodenal Ulcer*

*Symptoms:*

Generally—though not always—a person suffering from perforated ulcer of the stomach or duodenum gives a long history of abdominal distress. Acute pain “in the pit of the stomach,” associated with more or less shock, is suddenly felt. The pain is sudden and intensely violent, which is greatly increased by swallowing fluids, by vomiting, by turning the body, by coughing, by respiration, and by pressure. This pain may radiate throughout the abdomen, but the chief tenderness is in the region of the stomach. Vomiting occurs in about half of the cases at the time of perforation. Shock may be severe following the perforation, but as a rule, does not last long. A board-like rigidity of the muscles of the abdomen is present, and the temperature is usually normal or subnormal. The danger from perforated ulcer of the stomach or duodenum is peritonitis, due to the escape of stomach or duodenal contents into the peritoneal cavity.

### *Treatment:*

Bring the patient under the care of the surgeon as soon as possible before peritonitis sets in; in the meantime, put the patient to bed, give absolutely nothing by mouth, and put an ice bag over the stomach; and treat shock if present.

### *Gallstone Colic*

#### *Symptoms:*

Gallstone colic is due to the passage, or the attempt at passage, of a gallstone from the gallbladder to the intestines. Depending on the location of the stones, a person with gallstones may or may not be jaundiced. The patient frequently gives a history of stomach trouble with or without jaundice and may give a history of previous gallstone colic. The colic consists of spasmodic, excruciating pain over the stomach and liver, radiating upward over the right half of the thorax, frequently up under the right shoulder blade. The patient is very nauseated, and usually vomits, and often the vomiting is violent. The abdomen is distended and a condition of collapse soon appears. The respirations are shallow, the patient groans, cries out, or flings himself about the bed, often assuming strange contorted positions, trying to obtain relief, frequently holding one hand over the liver region. The duration of an attack is from 4 to 20 hours, although it may last much longer. The temperature is usually normal or subnormal.

#### *Treatment:*

Bring the patient under the care of a medical officer as soon as possible. In the meantime, place a hot-water bag over the liver at the lower border of the ribs. Give a morphine syrette and repeat with one-half syrette ( $\frac{1}{4}$  grain) in 3 or 4 hours, if necessary.

### *Kidney Stone Colic*

#### *Symptoms:*

This condition is due to a small stone from the kidney entering into the ureter, which it blocks, tears, or distends. The pain is gradual or sudden in onset, is fearful in intensity and runs from the lumbar region down the corresponding thigh and testicle and into the abdomen and back. There are nausea, vomiting, collapse, and sometimes unconsciousness or convulsions. Frequent attempts at urination result in pain but little urine. The urine is often smoky or red from injury to the ureter. After a time the pain vanishes, due to the stone falling back into the pelvis of the kidney or to its passing on into the bladder.

### *Treatment:*

Bring the patient under the care of a medical officer as soon as possible. In the meantime, put him to bed, give plenty of water by mouth to increase the flow of urine, place a hot-water bag on the affected side of the abdomen, and administer 1 syrette of morphine to relieve pain. Repeat with  $\frac{1}{4}$ -grain every 4 hours.

### *Food Poisoning*

#### *Symptoms:*

Sudden onset (usually 2 to 6 hours after the food has been eaten though may be as long as 72 hours) with violent diarrhea, vomiting, abdominal cramps, prostration, and dizziness. It occurs usually in epidemic form. The severity of symptoms will vary with different individuals. In most cases the acute symptoms will be over in 12 to 24 hours, leaving for several days a marked weakness, loss of appetite, and abdominal discomfort. Recovery is usually complete in 48 hours.

Outbreaks are caused by bacterial contamination of foodstuffs that have been prepared and allowed to remain at room temperature for varying periods of time prior to being served. The most common offending foodstuffs are: ham, other meats and meat mixtures, salads, milk and cream preparations such as cream puffs, custards and pies.

#### *Treatment:*

Give water freely. The patient should be placed in bed and a hot water bottle applied to the abdomen. Food should be withheld until 24 hours after cessation of the acute symptoms. There should be slow return to a full diet.

#### *General measures:*

Sources of infection can be eliminated only by insuring freedom from disease and a high standard of personal hygiene in all food handlers (particularly in regard to the matter of washing their hands after visiting the toilet), by serving foodstuff promptly after its preparation, and by maintaining a high standard of sanitation in the galley and butcher shop. It is particularly important that persons with boils, infected cuts or sores on their hands not be permitted to handle foods.

### *Hernia (Rupture)*

A *hernia* is the protrusion of some of the contents of the abdomen through a weakness in the abdominal wall. The most common hernia is in the groin and is called an inguinal hernia. It appears suddenly as a swelling following exertion and is evidenced by pain.

### ***Treatment:***

Let patient take a hot bath and go to bed, lying on his back with thighs bent. By so doing, the rupture will often reduce itself. Keep patient in bed for several days and do not let him move until he has seen a doctor. If the rupture does not reduce itself, the patient should be seen by a doctor as soon as possible, as the condition may cause strangulation.

### ***Blisters (Blebs)***

*Water blisters* develop on the skin as a result of local irritation such as chafing or pinching. They most commonly occur on the hands and feet. If an unusual amount of unavoidable pressure or rubbing of the skin is anticipated, blisters can often be prevented by placing a strip of adhesive plaster firmly over the area.

*Treatment:* (For blisters not caused by burns.)

1. Wash the blistered area gently with clean water and soap.
2. After drying the skin carefully, apply iodine or other antiseptic to one edge of the blister.
3. Sterilize a needle in an open flame.
4. Puncture the blister at its edge where the skin was sterilized with iodine. Gently press out the fluid.
5. Apply a dry sterile gauze pad over the blister.

If the blister ruptures, a raw painful area will be exposed. This should be protected with a small amount of vaseline, and then covered with a sterile gauze dressing. If the blister becomes infected, it should be treated as an infected wound. (See "Treatment of Infected Wounds," p. 112.)

[illegible]

## NOTES

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## MISCELLANEOUS EMERGENCIES

### *Wounds Caused by Splinters*

Splinters of wood, metal, glass, and other materials frequently pierce the skin and remain buried in the tissues. If the splinter is deeply buried, make no effort to remove it, but treat the wound as a puncture wound.

#### *Treatment:*

1. Sterilize the skin over the splinter with iodine or other antiseptic.
2. If the splinter is clearly visible, open or pierce the skin with a needle or sharp knife point which has been sterilized by passing it through a flame several times.
3. Remove the splinter. For this purpose, forceps or a hemostat are useful instruments. They are carried in the first-aid kit. Boil the instruments for 15 minutes before using.
4. Encourage bleeding from the wound (if it is superficial), thus washing it from inside out.
5. Apply a sterile gauze dressing.
6. If unable to remove it—dress wound and send for a medical officer.

### *Stye*

A *stye* is a pustule which forms on the margin of the eyelid around an eyelash. The lid is inflamed, painful, and has the general appearance of a small boil.

#### *Treatment:*

The infection responds rapidly to local applications of moist heat. Hot boric acid compresses are more often used. Apply 15 minutes at a time, repeat every second hour. Yellow oxide of mercury ointment applied to the margins of both lids at night will prevent crusting and permit drainage if pus has formed. Recurring styes may be a symptom of defective vision. In such cases the patient should be referred to a medical officer.

### *Foreign Bodies in the Throat*

If chicken or fish bones are visible remove them with the fingers or forceps, but if not visible induce patient to eat dry bread, potatoes, or similar starchy food, which frequently, will help to carry the obstruction down.

If a mass of food is choking the patient strike him sharply on the back between the shoulders to force it out, or use fingers to hook it out or force it down. Induce vomiting by tickling back of throat.

## Foreign Body, Eyes

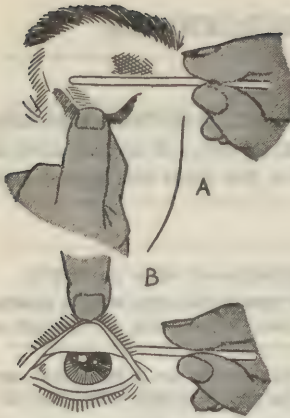


FIG. 137.—Eversion of the upper eyelid.

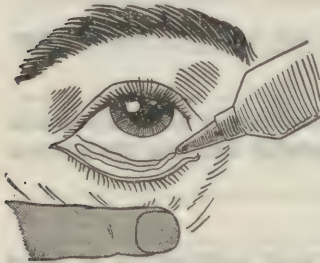


FIG. 138.—Technic of applying ophthalmic ointment.

In removing a foreign body from the eye, if it is not at first visible, evert the lower lid. (Fig. 137.) Have patient look down and then evert the upper eyelid. Remove it with cotton applicator or any soft clean cloth and apply a few drops of saturated solution of boric acid to eye. If foreign body is embedded in the eye, do not attempt to remove it as this type of case requires the services of a medical officer. Apply an ophthalmic ointment or sterile mineral oil to help avoid friction, close the eye, and apply dressing and bandage (not too tight).

If the foreign body in the eye is sharp then any pressure on the eyeball may cause further injury. When applying a first-aid bandage or cravat to the area over the eye, you can protect the eyeball from pressure by placing an inverted match box over the eye in such a manner that pressure will be on the edges of the box and not the eye itself.

## Earache

Any earache that persists for even a short time should be seen by a medical officer. This may be a symptom of a serious disease of the middle ear.

### Causes:

1. Infection spreading from nose and throat, or from the ear canal.
2. Concussion from blasts and explosions.

### Treatment:

1. Have hot water bottle to relieve pain.
2. Aspirin, grains 10, will help to relieve pain.
3. Have patient see a medical officer.

### ***Foreign Bodies in the Ear***

If an insect is in the ear, hold the affected ear uppermost and insert 5 to 10 drops of a bland oil, such as olive oil or liquid petrolatum. Then, after the insect is suffocated—syringe it out with warm water.

If a pea, bean, or other seed is lodged in the ear canal, never use water because the seed will swell; if visible, use a small hook and attempt to hook it out. Don't insert any instrument into the ear beyond where its tip can be seen. Soften hardened wax with a few drops of hydrogen peroxide, then remove it by syringing with 5 percent solution of sodium bicarbonate or warm water.

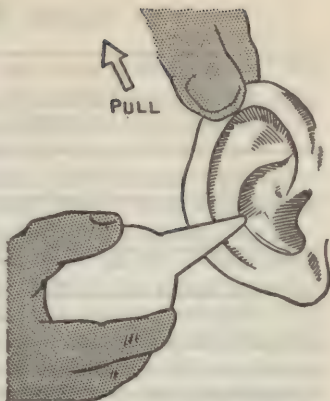


FIG. 139.—Technic of syringing the ear.

### ***Foreign Bodies in the Nose***

Ordinary objects lodged in the nose may be removed by holding the unaffected nostril closed and blowing. Sometimes snuffing a little powdered tobacco or pepper will induce sneezing and aid in the expulsion. If the object is visible it may be removed with bent wire or a small forceps. If these methods fail then refer the patient to a medical officer.

### ***Removal of Maggots***

Let the patient inhale teaspoonful of ether, until the maggots become stupefied. Then syringe them out with a warm saline solution.

## NOTES

## EXPOSURE TO HEAT

Under ordinary conditions, when the body is overheated, the excess heat is lost by the evaporation of sweat from the skin surface. Prolonged exposure to high temperatures may result, however, in one of the following conditions:

*Heat cramps*—This condition is usually seen in men working in the engine room, or a similarly confined place. It is due to the loss of large amounts of salt from the body by sweating.

*Heat exhaustion*—This condition results from the overheating of the body. Sweating cools the body only if the sweat is evaporated. In heat exhaustion the skin is sweating profusely, but evaporation and cooling are prevented by such external obstacles as heavy, tight-fitting clothing, poor ventilation, or a high moisture content of the surrounding air (high humidity). It is also due to the loss of large amounts of salt in the sweat.

*Heat stroke* (Sunstroke)—This condition results from the failure or "break down" of the body's cooling system. Though the body is overheated, the skin fails to sweat, and since the excess body heat cannot be lost by evaporation, the temperature rises to dangerous and frequently fatal heights. Usually results from excessive exposure to the sun.

Experience has shown that it is desirable for men working in high temperatures to drink water containing 0.1 to 0.3 percent salt. Salt tablets are supplied on ships but excessive use may cause gastric irritation and vomiting. Prepare your drinking water for these conditions as follows: 1 pound of salt to 100 gallons of water; 5 grams of salt to one gallon of water.

Take an increased amount of water. Three or 4 quarts of water may be needed in one day.

Wear light, porous, loose-fitting clothing.

Use blowers or electric fans to ventilate all compartments in which men are working.

Do not work too long in overheated surroundings. Regular short rest periods should be permitted.

Eat a moderate amount of light, easily digestible food such as vegetables and fruit. Avoid fats and heavy greasy foods.

Avoid the overuse of alcohol.

### *Heat Exhaustion*

*Heat exhaustion* is caused by a loss of salt from body by perspiration, due to working in excessive heat.

*Symptoms:*

1. Dizziness.
2. Profuse perspiration.

3. Nausea and vomiting.
4. Fainting.
5. Muscle cramps.
6. Pale face.
7. Subnormal temperature.
8. Weak, shallow pulse.

*Treatment:*

1. Remove to circulating air.
2. Treat for shock by keeping patient in a lying position, keeping him warm, and give stimulants.
3. Give patient one teaspoonful of salt dissolved in a glass of water.

### ***Heat Stroke (Sunstroke)***

*Symptoms:*

1. History of exposure to heat or the sun.
2. Pain in the head.
3. Dizziness.
4. Frequent desire to urinate.
5. Very red, dry skin
6. Very high temperature, 105° to 107° F., or higher.
7. Pulse full and strong.
8. Patient suddenly falls unconscious.
9. Convulsions.
10. Cessation of sweating.
11. Seeing objects, red or purple.

*Treatment:*

1. Remove patient to shade or coolest place available.
2. Lay patient on back with head and shoulders elevated.
3. Remove clothing.
4. Pour water over body or rub with ice.
5. Give cool drinks (not iced) after consciousness returns.
6. Do not give stimulants.

### ***Heat Cramps***

*Symptoms:*

1. Severe, painful, muscular cramps, involving, particularly, the muscles of the abdomen, legs, and arms.
2. There may be symptoms similar to those of heat exhaustion.

*Treatment:*

1. Apply hot water bottles or hot cloths to the abdomen and other areas of muscle cramping.
2. Keep patient at rest.
3. Give plenty of water with a high salt content.

## DISEASES OF THE SKIN

### *Scabies*

*Scabies* is an itching disease (known as the "7-years' itch," etc.) found among people living in unclean surroundings and habits. The cause of scabies is the itch mite. It is therefore a contagious disease and may be passed from one another by close contact. The itch mite travels from one patient to another through the medium of clothing, towels, bed linen, and personal articles. The most common way of passing the disease from one to another is in having two or more persons using the same bed and same clothing.

#### *Treatment:*

All clothing and bedding belonging to or used by the patient which has been in contact with his skin, whether freshly laundered or soiled (such as underwear, pajamas, and socks) should be collected and sterilized by heat (steam or boiling water). Woolen clothing may be sterilized by thorough steaming with a hot iron and wet cloth as in pressing, or it may be dry-cleaned. Before retiring, the patient should take a hot bath using plenty of soap. The surface of the skin, particularly in the vicinity of the eruption, should be thoroughly scrubbed.

Following this bath, an ointment consisting of sulfur and lard, commonly known as the official sulfur ointment in the proportions of about 1 teaspoonful of sulfur to 1 ounce of lard, is rubbed thoroughly into the skin from the collarbone downward entirely over the body to the soles of the feet, particularly in the vicinity of the eruption between the fingers, between the toes, and in the skin-folds. There is no occasion to apply the medication above the collarbone, since the disease seldom attacks that portion of the body.

Whenever an application of sulfur ointment is applied at night, a hot bath with much soap must be taken the next morning. The sulfur-ointment application should be repeated once a day preferably just before retiring until the eruption and itching have subsided, when it may be assumed that the patient has been cured. All clothing used by the patient during the preceding 24 hours should be collected and sterilized.

The patient may use two sets of clothing, underwear, socks, pajamas, sheets, etc., changing each day and sterilizing that worn or used the day before. Laundering each day is desirable but not necessary. Should the eruption continue and the itching remain unabated, a second series of treatments as described should be given. Too long an application of these treatments, however, is

not advisable since the sulfur tends to cause an irritation of the skin which may cover up the scabies. If the skin gets very rough and generally red from irritation, limit treatment to anointing the body with petroleum or zinc ointment.

Any locker or other place used by the patient in storing clothes, should be disinfected with the Navy standard insecticide. This may not be used in treatment, however, since actual contact is required. The insects, like termites, being within the layers of of the patient's skin, cannot be reached.

### ***Ringworm***

*Ringworm* is a highly infectious disease of widespread prevalence, particularly in the tropics and subtropics and during a hot, humid summer in the temperate zone.

In adults it affects all parts of the body, though rarely the scalp. On the face it is commonly called "barber's itch," in the crotch "dhobie itch," or "jock-strap itch," and on the feet "athlete's foot."

The cause is an infection with a fungus or mold. When well developed, it tends to form circles (ringworm) or parts of circles. Itching is a prominent symptom. In some cases, concentric circles develop or rings form upon one another, making various patterns. The spreading border is red or reddish and more scaly than the central portion which may appear normal to the unaided eye. It may begin as a few or numerous small red patches with scaling vesicles and crusts. It may be transferred from one part of the body to another by scratching the bare skin.

#### ***Treatment:***

The fungus is very partial to dark, damp places such as swimming pools, wash and bath rooms, and the inner recesses of deck swabs. As the infection frequently starts on the feet, members of the crew as well as the patient should be advised not to go barefooted but to wear some sort of a sandal, particularly in going to and from the shower, and to dry the toes thoroughly after bathing. Maceration of the skin in hot, moist weather favors spread. After bathing and while wearing shoes, the use of a good antiseptic powder on the feet and between the toes is advised. The decks of the shower, baths, and washrooms should be scrubbed daily and swabs should be washed daily and dried in the sunshine. The patient should see a medical officer. The more intractable cases may require extended medical treatment.

### ***Poison Oak, Ivy, and Sumac***

These three plants all belong to the same family and are the common cause for skin irritations. The irritation is caused from minute droplets of oil that are secreted by these plants.

If the skin comes in contact with the smallest quantity of this substance, the area becomes red and swollen, followed by very severe burning and itching. Soon blisters are formed. If the patient scratches the exposed area, he gets this substance on his fingers and spreads it to other parts of his body.

*Poison Oak*—Despite the name “oak”, this is not related to the oak family nor is it a tree. The leaves are broad and a dark shiny green. The edges of the leaves are notched. They are always arranged in groups of three. Although it may be found as a creeper, it usually grows as bushes or shrubs.

*Poison Ivy*—A “creeper” and a climbing plant. It grows more frequently around poles, trees, and fences as well as along old stone walls and embankments. It can be recognized by the characteristic three leaves that grow on each stem. These leaves are shiny, pointed, with prominent veins.

*Poison Sumac*—Shrubs or small trees. Not infrequently do they attain the height of 15 to 20 feet. The poison sumac always has loose drooping clusters of white berries. The nonpoisonous plant has no berries.

#### *Treatment:*

1. Explain to the patient that scratching can spread the irritation from one part of the body to another.
2. The earlier first-aid treatment is given after exposure, the milder the effects will be.
3. Wash the exposed parts promptly and thoroughly with water and strong soap, followed by alcohol.
4. Calomine lotion can be applied if available.
5. If clothes irritate the area, apply a dry dressing and bandage.

#### *Hives*

*Hives* are the result of sensitivity to some kind of food. Shell fish and berries are most often the cause. The rash appears suddenly as reddish wheals and may occur in few or large numbers. The wheals itch intensely and have an elevated whitish center. They remain for several minutes or several hours.

#### *Treatment:*

1. Give a laxative to cleanse the stomach and bowels from the sensitive food.
2. Apply calomine lotion to the itching areas. A paste of sodium bicarbonate and water, applied to the skin also may be used.
3. If no improvement is seen after several hours, have the patient see a medical officer.

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## MINOR SURGERY

Attempts to suture wound edges together should not be made when the patient can be brought under the care of a medical officer in the very near future, but if hours or days must elapse before his services can be obtained, suturing should be done in cases requiring it. Remember, when you use the procedures necessary to suture a wound you are giving treatment and not first aid, and that these procedures are entirely different.

### *Superficial Wounds*

Only wounds that require no suturing are included under this heading. Even though a wound is only superficial, it should be treated immediately to prevent infection.

*Abrasions:* If the area is dirty, wash the abrasion gently with soap and water; use a detergent if necessary. Apply sulfonamide powder and a dry, sterile dressing.

*Superficial lacerations:* In many instances superficial lacerations are too short and shallow to suture. A convenient method to approximate the wound edges is by the use of "butterfly" adhesive strips. (Sometimes called "dummy straps.") Cut a strip of adhesive at least 3 inches long, and near the center cut away the adhesive on each side so that a center bridge about  $\frac{1}{4}$  inch wide and  $\frac{1}{2}$  inch long remains. Sterilize the center ridge with a match flame. Place one end of the butterfly strip to the skin surface on one side of the wound, and after bringing together the wound edges with a sterile thumb forceps, secure the other end of the butterfly strip on the opposite side of the wound. This holds the wound edges together (Fig. 140).

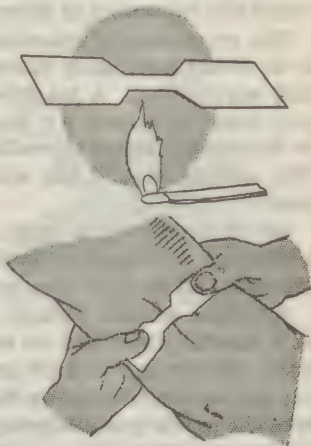


FIG. 140.—Dummy strap.

*Punctured Wounds:* All punctured wounds should be treated with the utmost respect, as dirt and foreign bodies can be retained because of the small entrance and lack of bleeding. Keep the part at rest and use continuous heat until all danger of infection has passed. All patients having received punctured wounds should have a "booster" dose of tetanus toxoid ( $\frac{1}{2}$  cc).

## ***Deep Wounds***

Before any deep wound can be treated, it is necessary to stop bleeding. If the various methods for controlling hemorrhage described on page 5, cannot control it, then it will be necessary to apply a hemostat to the bleeding vessel and tie it. Therefore, if the wound continues to bleed after the dressings are removed or the tourniquet released, reapply the tourniquet and prepare to tie the bleeding vessel and suture the wound.

Treat shock as soon as possible and do not attempt any repair procedure until the patient has sufficiently recovered from this condition. The control of hemorrhage is the only procedure that precedes the shock therapy.

Examine the wound after the patient has recovered from shock. Inspect it for the presence of foreign bodies unless the history of the injury precludes any doubt about the presence of any. The edges of a wound should not be brought together before foreign bodies and dirt have been removed and wound edges cleaned. Wounds in which inflammation is present should be left open and allowed to drain, and treated according to the instructions given under the treatment of infections.

The prevention of infection must always be kept in mind. There is no better method of cleansing the skin than by the use of soap and warm water. A fat solvent such as benzene, ether or a detergent may be necessary if there is much grease around the wound. If 70 percent alcohol is available, follow with at least two washings. The surface around the wound may be painted with some antiseptic.

When the wound is in the hairy parts, the area around it must be shaved. For wounds on the head, cut away a suitable area with scissors, and shave with a razor.

Maintain aseptic technic when suturing a wound. If you are in a locality where you do not have all the facilities necessary for good technic, do the best you can with what you have. Sterilize the instruments by boiling them in water at least 15 minutes. Sterilize the towels you are going to use for draping around the wound by either boiling them or baking them in an oven. Your hands should be scrubbed with soap and water and sterile gloves used, if they are available. If not, the hands can be daubed with tincture of iodine or some other antiseptic that is handy. Keep your fingers out of the wound, use the sterile instruments as much as possible, that's what they are for.

The same care is necessary in preparing for a minor operation as is required for a major one. Put on a cap and mask, and scrub the hands with soap and water for 10 minutes. Rinse them thor-

oughly in 70 percent alcohol. Dry your hands on a sterile towel and put on your gown and gloves.

Place sterile drapes around the wound so that the opening gives good exposure of the site (Fig. 144). A small opening may be made with sterile gauze by pushing your fingers through the center and making an opening of the required size (Fig. 141).

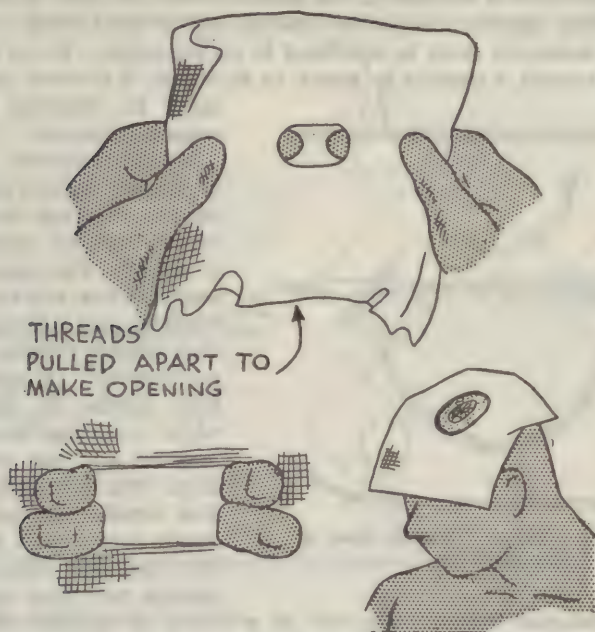


FIG. 141.—Improvised drape in preparation for minor surgery.

**Chemotherapy:** Sulfanilamides should be applied to dirty wounds in generous amounts—the amount depending upon the size of the wound. Usually 5 to 10 Grams are ample. If there are multiple wounds, and sulfanilamide is placed in all, the amount should not exceed 15 Grams.

Remember to be gentle when treating a wound. Needless trauma only increases the injury, invites infection and delays healing.

### Suturing

Sutures are made of various materials and are either absorbable or nonabsorbable. Their use depend upon the nature of the wound or the site to be repaired. When a suture is used to tie a blood

vessel it is called a ligature. The absorbable sutures are made of plain cat gut, kangaroo tendon and chromic cat gut. A chromic suture is gut that has been chemically treated to delay its absorption.

The nonabsorbable sutures are silk worm gut, horsehair, linen, nylon, cotton and silk thread, metal clips and silver wire.

Sterile sutures are put up in sealed tubes or vials. The tube, containing alcohol, keeps the sutures sterile until used. Other suture materials must be sterilized in an autoclave. In an emergency, creosol, 5 percent in water, or Formalin, 5 percent, may be

used to disinfect such suture material.

*Needles:* Various types of surgical needles may be used in suturing, depending on the site and type of wound. The commonly used needles are straight (cutting and noncutting) and curved (cutting and noncutting). A noncutting needle is smooth, while a cutting needle is tapered and has cutting edges (Fig. 142). The cutting needles are used on tough tissue such as the skin, and the noncutting needles are used on the

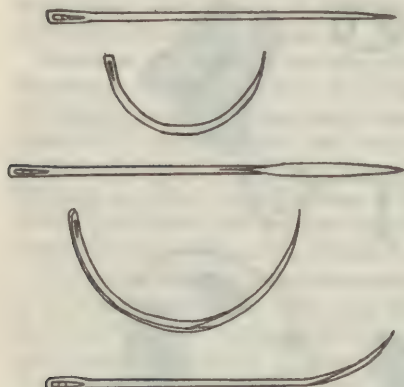


FIG. 142.—Types of needles used in suturing.

more delicate tissues. The use of a round or straight cutting needle for suturing skin edges depends on which is available and the preference of the operator—both are equally as good.



FIG. 143.—Types of sutures: (l. to r.): Interrupted, continuous, lock, mattress and metal clips.

**Methods of Suturing:** When the wound is superficial, closure of the skin with a continuous or interrupted suture of fine cotton, dermol or silk will do (Fig. 143). However, the size of the suture and caliber of the needle, depend on the tissue to be sutured. For wounds on the face, interrupted sutures of fine material should be used, since this type of suture encourages healing with the least amount of scar tissue. Other suture methods are the blanket or lock stitch the mattress suture and the use of metal clips

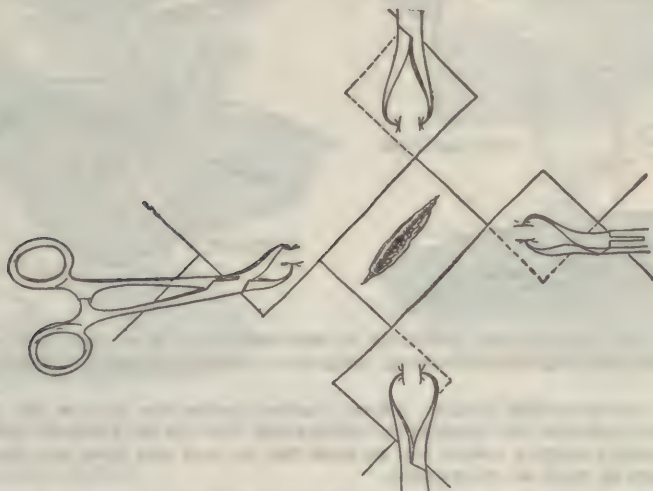


FIG. 144.—Drape of wound in preparation for suturing.

### **Technic of Suturing Wounds**

1. Follow the general instructions for treating deep wounds (p. 172).
2. Assemble all sterilized equipment and instruments.
3. Put on your cap and mask. Scrub your hands and forearms for 10 minutes, rinse thoroughly in 70 percent alcohol, and put on your gown and gloves.
4. Cover a tray or a suitable substitute with several sterile towels, and place your sterile equipment and instruments on them.
5. Using a sterile hemostat, grasp a sterile gauze dressing and clean the area around the wound well with soap and water. Use another sterile gauze dressing and follow with two applications of 70 percent alcohol. Drape the area with 4 sterile towels and secure with towel clips (Fig. 144). A piece of sterile gauze, with a hole in the center, may also be used.
6. If the wound is dirty, irrigate it with a sterile saline solution and gently use a sterile sponge to clean the interior of the wound. Clean the area with alcohol and drape in the above manner.
7. Break the container holding the suture in a sterile towel so that you do not cut your fingers. Cut the suture into 12-inch lengths and thread

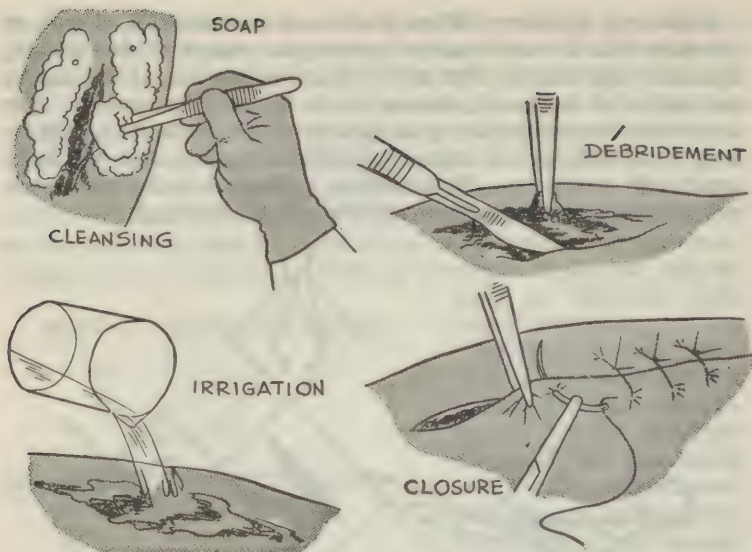


FIG. 145. Technic and procedure in debridement of a wound. The successive steps are cleansing, irrigation, debridement and closure.

two curved cutting needles. NOTE: Curved needles are used in this procedure only for the purpose of illustrating the use of a needle holder. A straight cutting needle can be used just as well and does not require the use of such an instrument.

8. If the edges of the wound are macerated and dead, do a debridement as shown in the illustration. Pick up the dead tissue with the thumb forceps and with the knife cut it away. Keep the cut edges smooth and even, so that when you bring them together with a suture, they will fit close and will not gap. Place sulfanilamide crystals into the wound, the amount depending upon the size of the wound.

9. Clamp the needle with the needle holder just past its center towards the suture. Do not clamp the needle any closer to its eye or it will break.

10. Using thumb forceps, lift up the skin edge at one end of the wound. Push the needle through the skin to the underside about  $\frac{1}{4}$ -inch from the wound margin, and pull all the suture through until about 2 inches is left on the outside.

11. Use the thumb forceps again and pick up the opposite side of the wound. Push the needle up through the skin from the underside, about  $\frac{1}{4}$ -inch from the wound margin. Pull the suture through, still leaving the 2-inch end on the opposite side.

12. Lay the needle holder and needle on the sterile drape at the side of the wound. With your right hand hold the end of the suture, and with the left grasp the suture on the opposite side near the wound. Gently lift both hands, pull the wound edges together, and tie a square knot.

13. Cut the ends of the suture about  $\frac{1}{2}$ -inch from the knot.

14. Repeat the procedure, spacing the sutures about  $\frac{1}{2}$ -inch apart.
15. Apply a sterile dressing and secure it with adhesive tape or a bandage.
16. Be gentle in handling the wound edges with the forceps. Always make the stitch the same distance from each side of the wound to prevent overlapping of the skin or puckering, otherwise healing will not take place rapidly.

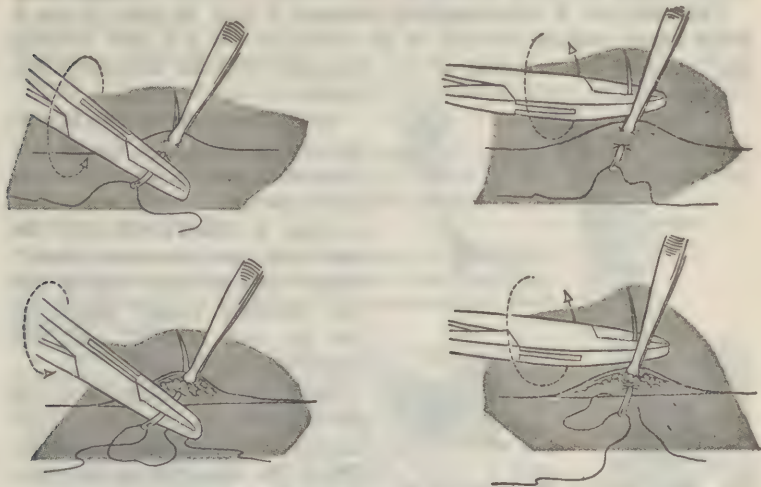


FIG. 146. Technic of handling a suture needle in closing a wound.

### **Removing Suture**

Sutures should be removed on the fifth to seventh day depending on their location and the amount of tension upon the wound edges.

Paint the suture line with a skin disinfectant. With thumb forceps apply traction at one side of the suture above the wound, lift up and cut the suture below the part originally exposed on the

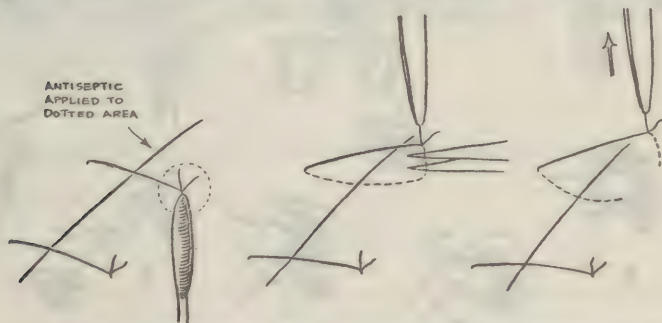


FIG. 147. Technic of removing a dermal suture.

surface (Fig. 147). The contaminated part will not be pulled through the tissues. Apply a sterile dressing. If signs of infection are present around the suture, remove the stitch and apply moist heat.

### ***Technic of Tying a Blood Vessel***

This method is recommended because it can be used to tie a blood vessel without the aid of an assistant. It is a safe technic and permits the removal of the hemostat without loosening the knot.

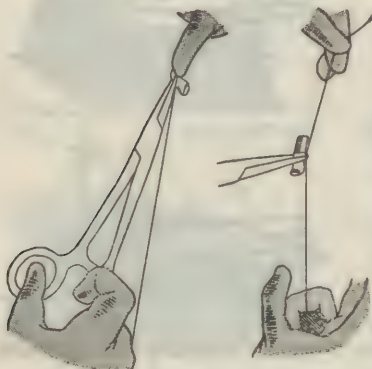


FIG. 148. Technic of grasping a "bleeder" and showing where to tie it.

Grasp the point of the bleeding vessel with the tip of the hemostat, seeing that the instrument has a big enough bite so that it doesn't slip off. Be sure that the hemostat doesn't clamp on any other tissue but the bleeding vessel, otherwise the tie may slip off and the bleeding start again.

Hold the suture in palm of the right hand, so that the right thumb and index finger are free. Grasp the free end of the ligature between the left thumb and index finger. Place the ligature

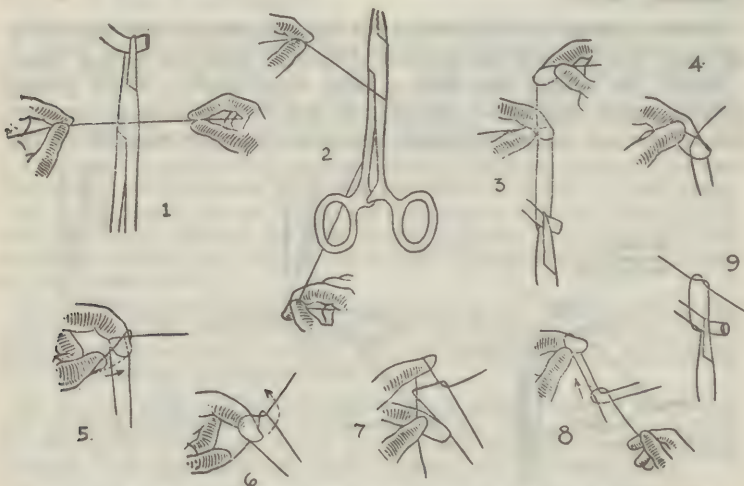


FIG. 149. Nine steps involved in tying a knot around a "bleeder."

under the hemostat with the right hand and carry it beyond the tip of the instrument under the blood vessel. Next, use the left thumb and index finger to make the tie and pull it tight. (Figs. 148, 149). Keep the tension by a steady and careful pull on the ligature with the right hand, and with the left forefinger hold the tie in place. Maintain the tension, remove the hemostat with the right thumb and index finger, and complete the knot.

### ***To Incise a Boil or Abscess***

The opening of any abscess should be made large enough to adequately drain the cavity.

1. If the boil is on the neck or back, lay the patient face down and make him comfortable. If it is on an extremity, place the part on a flat surface, to have it at rest, with the patient either sitting or lying down.

2. Paint the skin area over the abscess or boil with a skin antiseptic. Have plenty of sterile dressings available to prevent the contents from running over clean areas of the skin.

3. Use a sharp pointed knife. Insert the point into the cavity gently and quickly with the cutting edge directed upward. Lift upward as you withdraw the knife and enlarge the incision. One such incision may be sufficient, but in a large abscess it may be necessary to make a second incision. Make this at right angles to the first incision. This is called a cruciate or crossed incision. (Fig. 150.)



**FIG. 150.** Cruciate or crossed incision.

4. After the contents of the abscess have been evacuated apply moist wet dressings until the drainage has ceased enough to apply dry ones.



**FIG. 151.** Technic of incising a boil.

### ***Ring Trick***

To remove a ring from an injured and swollen finger when the use of soap or soap and water have proved unsuccessful, the following is a simple and practical method that can be used without cutting the ring:

Place a stout piece of string about 50 inches long through the ring, leaving a 2-inch tail extending over the back of the patient's hand. Hold this short tail with your left hand and with your right hand wrap the long end spirally and tight around the finger distally, keeping the turns close together, until you have covered the swollen joint. Hold this distal end tight (Fig. 152). Take the short tail that has been held in the left hand and unwind the spiral wrappings, using a continuous pull upward, as each turn is unwound. The ring will gradually work forward and off.

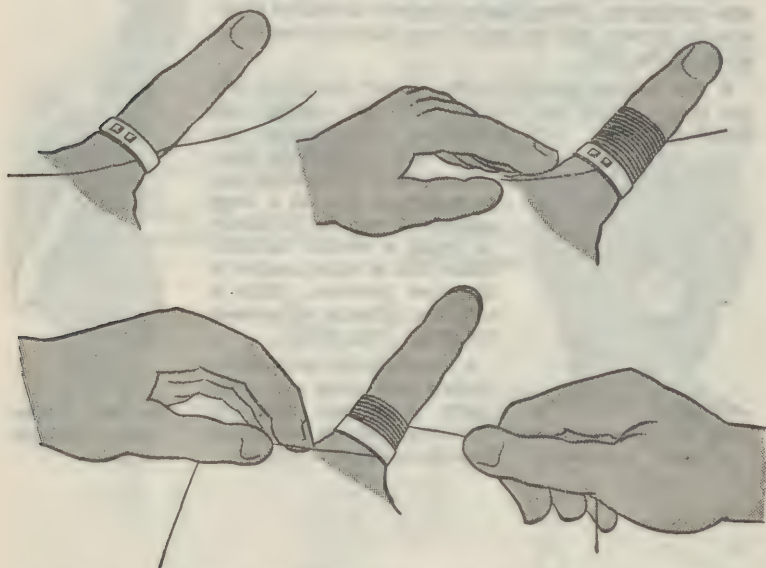


FIG. 152. Technic of removing a ring from a swollen finger.

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## EMERGENCY DENTAL TREATMENT

In the absence of a dental officer or a dental technician, the hospital corpsman may be called upon to render emergency dental treatment for the temporary relief of pain and to provide comfort. Where traumatic injuries call for emergency first aid, it should be given immediately.

The three most important first-aid measures in any emergency, including dental, are: (1) to prevent and/or combat shock, (2) to arrest hemorrhage and (3) to maintain an open air passage. Shock and hemorrhage are discussed in another section.

The first and most important step is to see that the patient—particularly if he is in shock—has not swallowed his tongue, or aspirated a full or partial dental plate (or any other foreign object) into his pharynx which might suffocate him.

Other emergency services which the hospital corpsman can give, such as the relief of oral pain and discomfort, are less urgent in nature. The equipment and supplies at hand, even in the sick bay of a submarine or at a remote battle station, are usually adequate for good temporary treatment. There is also available a "Medical Kit for Dental Assistants, M-2," which contains the essentials for emergency dental treatment.

### *Toothache*

Toothache is by far the most common complaint; in most cases, it can be treated satisfactorily until the patient can be seen by a dental officer. When it is confined to the tooth alone, it is caused by irritation or injury to the pulp or nerves and tissue within the tooth itself. To remove or reduce the pain symptoms, it is necessary to remove the cause of the pain or to apply sedatives to the tooth. **DON'T USE ASPIRIN!**

In *deep cavities*, the food debris and only part of the softened tooth structure should be removed with dental instruments called spoon excavators. The cavity thus made is then dried with cotton pellets, and a paste of zinc oxide and eugenol is applied to the dried cavity. This paste may be easily made by mixing a few drops of eugenol (oil of cloves) with enough zinc oxide powder to make a thick paste. Mix on a glass slab or on a stiff piece of paper, with a knife or spatula. The paste is inserted in the tooth cavity with any suitable carrying instrument, and smoothed off, and the mouth is rinsed out with warm water. This usually relieves toothache in a matter of minutes.

If the pulp or nerve of the tooth is open and exposed to the mouth fluids, as may be evidenced by bleeding from the center of

the tooth, the cavity should not be sealed with the zinc oxide-eugenol paste, but just lightly covered with a pellet of cotton moistened with eugenol. This "open dressing" should be replaced from time to time if pain returns.

### ***Tooth Fracture***

If the visible portion of a tooth has been fractured and the pulp or nerve is exposed or open to the mouth cavity, the resulting pain may be relieved by applying zinc oxide-eugenol paste, directly to the carefully dried tooth surface. Sometimes, when a small part of a tooth is broken away, the nerve is not exposed, but the tooth is sensitive, nevertheless, and should be relieved in the same manner.

If a large amount of paste is used and allowed to overlap the adjacent teeth, it will more likely be retained until a permanent filling can be placed.

### ***Aching Jaw***

An aching tooth must be differentiated from an aching jaw or sore and bleeding gums. Medication applied to a tooth in the area of an aching jaw will not relieve the pain. It is necessary to treat the deeper, bone area. Hot saline mouth washes will help relieve pain and may assist in localizing intraorally any infection that may be present in the underlying tissues. It is extremely important not to use hot applications on the outside of the face in these cases as this may cause the infection to spread into the tissues of the cheek and neck. Chemotherapy by mouth with sulfadiazene may be indicated and *antipyretics* can be given in the presence of body fever.

A localized infection in the bone at the root ends of a tooth is called an abscess. The pain that accompanies this alveolar abscess in its early (acute) stage may be relieved by internal medication with codeine and aspirin or other sedatives. When, after frequent hot saline mouth washes, the abscess localizes and begins to form its own drainage point—most often on the outside surface of the gum near the roots of the tooth—pain usually subsides. The swollen bump or "gum-boil" at this local point contains pus which in time will break through and establish its own drainage.

If it is apparent to the touch that pus is present, the "gum-boil" may be incised right to the bone beneath it; drainage of this area can be maintained by inserting a small iodoform gauze dressing in the incision.

Patients with alveolar abscess often are quite sick. They should be put to bed, given a soft diet with forced fluids, frequent hot saline mouth washes and internal medication as indicated to combat pain, infection, and fever.

## ***Bleeding Gums***

Bleeding gums are not of serious consequence unless the bleeding is accompanied by infection and pain, and is persistent. Often bleeding is due to improper tooth brushing or to irritating dentifrices or mouth washes. However, when the resistance of the patient is low and the microorganisms present in the mouth begin to multiply and gain entrance to the inflamed tissues, a very serious infection known as "Trench Mouth" may result. This disease, properly called Vincent's Infection, is usually accompanied by pain and bleeding of the gums during tooth brushing and while eating. The gum tissue has a red, inflamed appearance, and is sometimes covered with a grayish-white membrane which can be easily wiped away with cotton. Ulcers frequently appear at the tip of the tissue between the teeth, giving the gums a "cupped-out" or a "chopped-off" appearance. There is a characteristic foul odor to the breath, and again, the patient may be very sick.

This disease may be treated by the hospital corpsman with excellent results. If the patient has a marked elevation in temperature (over 101° F.), hospitalization is advisable. Since one of the chief predisposing causes of this disease is poor oral hygiene, measures should be instituted to insure maximum mouth cleanliness. Dead or necrotic tissues and food debris should be wiped away with cotton swabs. An effective therapeutic agent is a mouth rinse of 1½% hydrogen peroxide flushed about the mouth every 30 minutes during the acute (painful and inflamed) phase of the disease. Tobacco, alcoholic beverages, or any other local irritants such as hot sauces and spices should be avoided. The patient should be referred to a dental officer as soon as possible.

## ***Wisdom Teeth***

Erupting wisdom teeth, or those molar teeth in the back corners of the mouth which may be near the gum surface are often the cause of much pain and soreness. The flap of gum tissue which partly or entirely covers the tooth is usually inflamed, swollen, and quite tender. It is often subject to biting by the opposing tooth due to the edema present. Infection by Vincent's organisms may also occur unless the area is kept clean. Swabbing the area every 3 or 4 hours with tincture of merthiolate or dilute tincture of iodine (3 percent) will reduce the possibility of infection. There may even be a pocket between the tooth and the gum flap from which pus exudes, and this pocket may be kept open and drained with a small piece of iodoform gauze gently placed. It is also necessary to apply an astringent to shrink the gum flap away from the area and allow for better cleansing by a forced stream of water. A good astringent

which is also antiseptic—dental glycerite—is in the medical supply catalog. Argyrol may also be used. Frequent hot saline mouth washes are indicated.

### *Dislocated Jaw*

Dislocated jaw may occur because of excessively wide yawning, or following a blow struck while the mouth is open. This condition is very painful, and the patient cannot obtain relief without assistance. When the lower jaw is dislocated, the mouth is open beyond its normal limit and the jaw joint is quite painful because of stretching or tearing of the ligaments and muscles of the joint. (Sometimes dislocation is on only one side, with the open jaw deflected to the opposite side.)

Reduction and relief from this abnormal straining of the joints is effected by placing the thumbs on the back or molar teeth of the lower jaw and firmly forcing the jaw downward and then backward so that the jaw will return to its normal position. The thumbs should be wrapped with gauze, as the patient sometimes bites forcibly when the mouth closes. (See fig. 108, p. 97.) Hot packs at the sides of the face will often help relax the jaw muscles before reduction is attempted or if the first attempt to reduce the dislocation fails. The patient should be instructed to eat only soft foods, and to use care in chewing and yawning until after the muscles and ligaments are well healed.

### *Postsurgical Emergencies*

After dental surgery, a man may return to his ship or station and find that his recent extraction requires further treatment. It is not always necessary to return him to the base dental facility; the hospital corpsman may be able to give him effective treatment. Occasionally a tooth socket will either continue to bleed or begin bleeding sometime after the extraction. Ordinary hemorrhage may usually be stopped by having the patient bite down on a sterile gauze pad for 30 minutes. He should be sent to light duty, or even kept in his bunk, depending on the severity of the case. Secondary hemorrhage following tooth extraction may occur and is treated in the same manner. Occasionally the blood clot may be partially or wholly lost in too-vigorous rinsing by the patient or through chewing on that side of the mouth. The loss of a blood clot, sometimes termed "dry-socket," usually is extremely painful, and must be treated for the pain as well as for possible infection and complication.

Loss of a blood clot exposes underlying bone, and serious infection may follow. To minimize this danger, an antiseptic or germicidal dressing should be placed lightly in the socket. Sedative

medication to relieve the pain may be added to the dressing; iodoform gauze dipped in eugenol makes an ideal dressing for this condition. Pain will be relieved in a matter of minutes. The dressing should be changed whenever necessary—at least daily.

## ***Jaw Fractures***

First-aid treatment for jaw fracture consists of making the patient comfortable, keeping the mouth clean and bandaging the fractured parts to prevent aggravation of pain by movement. It may be necessary to administer sedatives. Keep the patient in bed and apply cold applications to the outside of the face. In severe cases, where many of the facial bones are fractured, a minimum amount of handling or manipulation is advised, especially when any nasal discharge is evident.

If it is possible to replace the fragments so that the teeth will fit together naturally and comfortably without undue discomfort to the patient during manipulation, a head bandage similar to the Barton bandage may be used to immobilize the fragments. This bandage must be modified to omit the turn in front of the chin. A liquid diet is indicated, high in protein and fat, and low in carbohydrate. Cleanliness of the mouth will keep infection to a minimum, and can be effected by frequent rinsings with warm saline solution and swabbing with cotton applicators. Bleeding from the fracture wound within the mouth will often cease when the fragments are placed in their proper relationship.

The majority of jaw fractures are of the compound type—the fracture lines communicating with the mouth fluids and oral bacteria—hence a constant vigil for infection and temperature elevation must be kept. Dental consultation and treatment must be sought at the earliest possible time.

In the absence of a dental officer there are many things the hospital corpsman can do to relieve pain and suffering in the men under his charge. A patient who has had some sleepless nights and the severe pain of a toothache will be grateful indeed for the relief, even if only temporary. However, persistent or recurrent pain is usually a sign of some pathologic disturbance, and if definitive treatment is not given by persons thoroughly familiar with the possible consequences, very serious complications may ensue. It is therefore imperative in all cases of emergency dental treatment rendered, that the patient be seen by a dental officer as soon as possible.

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## **HOSPITAL CORPSMEN WITH MARINES IN THE FIELD**

The hospital corpsman serving with the Marine Corps in the field performs a duty that through two World Wars and countless other engagements in foreign lands has become as legendary as the exploits of the Marine Corps itself. Highly lighted by courageous devotion to the saving of the lives of their comrades in arms under the most hazardous conditions, his actions have earned the respect and gratitude of a military organization that prides itself on its fortitude in battle.

This reputation was not won easily nor will it be maintained easily. The honorable heritage handed down by hospital corpsmen from battlefields wherever Marines have been engaged, demands the best of many attributes of the medical personnel if that heritage is to be carried on.

A brief outline of the organization of the medical department with the Fleet Marine Force and of the method in which casualties are handled will assist to prepare the hospital corpsman for this type of duty, but it is only through training with Marines in the field that he becomes qualified to carry out his important mission. The comment on the special attributes that are necessary for the full performance of duty in the field will serve as a guide to the preparation of the hospital corpsman for such duty.

## **ORGANIZATION OF THE MEDICAL DEPARTMENT WITH THE FLEET MARINE FORCE**

The Marine Corps is a flexible organization that allows for task units of varying strengths to be available for specific missions assigned. Similarly, the Medical Department with the Marines is so organized that the degree of medical support can be built up to provide care of casualties for a specific mission. In general, however, the medical department may be divided into two groups according to their functions in the field. First, the organic medical sections of the combat elements that provide initial first aid and such other measures as are necessary to put the patient in condition for further evacuation; and second, the hospital elements in direct support that provide definitive surgical and medical care for those who cannot be further evacuated.

## ***Organic Medical Sections***

The medical personnel attached to these units are a permanent part of the particular combat element; they train, live, and accompany the unit to which they are assigned, at all times.

Personnel of the infantry battalion medical section are divided, in accordance with their function, into company aid men and the battalion-aid-station personnel.

*Company aid men:* These are assigned, two to an infantry platoon, and accompany their platoon at all times and in all situations.

*Battalion aid station:* These personnel, consisting of the two medical officers and the remainder of the battalion medical section, operate one or more aid stations to the immediate rear of the front.

Separate battalion medical sections vary in size depending on the size of the battalion with which they serve. These separate units are the engineer, tank, antiaircraft, amphibian tractor, and headquarters and service battalions. In view of the fact that line personnel of these battalions are assigned to operate in support of the infantry, the casualties that occur during an engagement are handled through the infantry battalion medical sections and the main effort of the separate battalion medical section is directed toward setting up an aid station in the area of their battalion command post, with medical personnel as needed being assigned to small detachments operating independently of the battalion.

Artillery regimental and battalion medical sections are medical sections which set up aid stations in the area of the regimental and battalion command posts and in addition assign two hospital corpsmen to each firing battery.

Shore party regimental and battalion medical sections also vary in size depending on the particular mission and have as their function the maintaining of the shore party evacuation stations on each landing beach. They facilitate the actual transfer of the casualties from the beach to the landing craft.

## ***Attached Medical Troops***

These medical personnel comprise the medical battalion of a Marine Division and are assigned for hospital support to infantry organizations as needed for any given mission. Under the present table of organization, one medical platoon of a medical company, capable of operating a 60-bed surgical installation, is assigned to support one infantry battalion. A section of this platoon, the collecting element, has the function of facilitating evacuation from the battalion-aid station to the hospital installation.

## EMPLOYMENT OF MEDICAL SECTIONS IN CASUALTY EVACUATION

Casualties during an engagement are removed from the combat area through a series of medical department facilities called "the chain of evacuation." This chain starts with the company-aid man, who is with the first marines of his outfit to hit the beach and the first member of the medical department to come in direct contact with front line casualties. Other elements of the medical department making up links in the chain in their order of hitting the beach, and through which casualties pass, are the battalion-aid station, the collecting element, and the shore party evacuation station when the medical platoon is committed to the engagement and sets up its installation. A brief description of the employment and function of each link in the chain:

### *Company Aid Man*

He lands with his platoon and maintains a position in the immediate proximity of the front lines. When a casualty occurs, his first duty is to remove the casualty from the direct line of fire. It is here that training and cool appraisal of the situation are paramount. It is neither desirous nor necessary that the hospital corpsman expose himself recklessly in reaching the casualty. A knowledge of the field of fire, the type of fire encountered, and the appreciation of the protective features of the terrain, all add up to lessen the danger to the alert, trained aid man.

If time allows, consultation with the squad or platoon leader will result in a protective fire coverage that will give the venture a better chance of success. After removal of the casualty to a place of relative safety, such first-aid measures as are indicated and feasible are carried out.

These measures include control of hemorrhage, application of a battle dressing, morphine administration where indicated for pain, splinting of fractures, and the filling out of the emergency medical tag. With the aid of litter bearers, assigned from marine service personnel, the casualty is removed to the battalion-aid station. If the casualty is able to walk, he is directed to proceed to the aid station along the most protected route.

### *Battalion-Aid Station*

Personnel attached to the battalion-aid station are divided into two echelons and land in the last two waves of the first trip of the landing craft carrying their battalion. They set up an aid station in whatever protected location can be found on the beach. As the battle progresses inland, the aid station deploys forward, maintaining a position as close to the front lines as is reasonably safe from

direct rifle and machine-gun fire. Casualties received here are given such further treatment as indicated to put the patient in condition to be further evacuated. Further control of hemorrhage, checking of dressings and splints, and the administration of plasma, serum albumin, or whole blood, to combat shock, are within the province of this section.

### ***Collecting Element of Supporting Medical Section***

The collecting element is composed of eight hospital corpsmen and lands with the reserve company of the infantry battalion to which attached. On landing, they consolidate with battalion-aid station and when that echelon moves forward these personnel evacuate the casualties from the aid station to the beach, or to the medical platoon hospital when it becomes established ashore.

### ***Shore Party Evacuation Station***

This party lands at approximately the same time as the shore party commander and sets up a station for reception of casualties from the front. Casualties are given such supportive treatment as indicated and transported across the beach to landing craft for further evacuation to ships off shore.

### ***Medical Platoon***

The medical platoon lands on order when the combat has progressed sufficiently inland to provide a hospital site insured of relative safety from direct fire. When their 60-bed hospital has been set up, casualties which need immediate definitive treatment are routed through this installation. As the fighting progresses, this hospital moves forward in an effort to bring the surgical facilities as close to the casualties as the combat conditions will allow. It is in this installation that the trained technicians for laboratory, x-ray, and operating-room employment are stationed.

The entire platoon, however, must be trained intensively in their assigned tasks as speed in setting up the installation and a high degree of mobilization are necessary. The ward must be skilled in the post-operative care of the surgical patient, as once operated on the patient must be retained until he is fit for further evacuation. In landing operations where more than one battalion is employed, the medical platoons assigned to each battalion may leap-frog one another along the line of evacuation or may consolidate with one another to provide one large installation, depending on the tactical situation and the length of the chain of evacuation:

1. *Regimental medical sections*, which coordinate the evacuation from three battalion medical sections and maintain a first-aid station for the regimental headquarters area.

2. *Two hospital companies*, capable of setting up independent hospitals of 200 beds each. These companies may combine to form the division hospital in the rear of the division zone of action or may leap-frog along the line of evacuation as conditions demand.

### **Special Attributes of the Well-Trained Hospital Corpsman in the Field**

In order that a hospital corpsman may successfully carry out his mission with the landing force, he must have sound basic training in the duties of all hospital corpsmen. In addition, he must possess further attributes that will not only enable him to give proper care to casualties but also provide him with a measure of self-protection as well. A majority of the time a medical officer will not be available at the spot where life-saving first aid must be administered, and he is on his own. Even in situations where a medical officer is present to direct casualty care, the actual measures must be accomplished by hospital corpsmen when the casualty load is heavy.

### **Medical Attributes**

The hospital corpsman must be an expert in first aid. First aid in the field is directed toward the same goal as in other situations, with the important distinction that such measures are taken with the paramount idea in mind of putting the patient in condition for evacuation over a sometimes long and arduous route. The time element involved makes it imperative that particular attention be paid to control of bleeding. It may be several hours before the casualty can reach further medical aid over rough terrain.

Splints must be applied, not only to fractures but to limbs that have suffered large debridging wounds, to ease the patient during the litter carry and help prevent shock. Morphine must be administered with good judgment. The patient able to walk back along the line must not be "snowed under" with morphine lest he require litter bearers. On the other hand, men in a semicomatose condition, suffering severe pain, must be given enough morphine to quiet them to prevent their giving away the position of the troops to the enemy.

The hospital corpsman must have an accurate knowledge of traumatic shock. The ability to read the signs and symptoms of shock or impending shock and the decision as to what steps to take calls for keen judgment in his caring for a casualty in the absence of a medical officer. Movement of a casualty in shock will increase that shock and sometimes result in the needless death of the casualty. It is better in such circumstances to delay evacuation and give supportive treatment such as rest, warmth, and the administration of plasma. Gentle handling of these patients by

the hospital corpsmen, litter bearers, and ambulance drivers is of utmost importance.

The hospital corpsman must have a good knowledge of the intravenous administration of fluids. All hospital corpsmen in the field must be expert in the administration of intravenous fluids such as saline, dextrose and saline, plasma, serum albumin, and whole blood. The medical officer may be there to direct what should be given, but the hospital corpsman must be prepared to carry out these directives.

The hospital corpsman must know how to administer preoperative and post-operative care. The success of surgical procedure depends a great deal on his ability to properly prepare the patient for operation and to give supportive care following surgery. Routine hygienic care, the administration and supervision of continued flow of intravenous fluids, careful attention to the pulse, blood pressure and respirations of the patient and an appraisal of any change in his condition, changing of surgical dressings, and many more details of patient care and ward management must be well learned.

The hospital corpsman must possess an ability to improvise. This is one of his most important attributes in the field. While the general pattern of medical department activities and the methods of caring for casualties remains the same, every operation and every situation encountered in an operation has its problems that must be met and overcome. Terrain features, climatic conditions, and enemy interference combine to produce new situations that demand initiative and aggressive action. Laboratory, x-ray, and operating room technicians will at times have to accommodate themselves to working spaces that at first view appear hopelessly inadequate, but with intelligent appraisal and improvisation may be made to do. The medical supply man may find that some of his vital supplies have been lost through enemy action and he must secure replacement from some other unit or from ships off shore. The man directing litter bearers may find the route of evacuation impossible due to terrain features or enemy interdiction of the usual route and must utilize all his knowledge in selecting alternate channels. His whole attitude in the field must be that of accurately sizing up the conditions under which he must work and then strive to make them as near the optimum as possible.

The hospital corpsman must possess an extensive knowledge of sanitation and preventive medicine. In the field he must have an intimate knowledge of all individual preventive medicine measures that must be carried out by the troops, not only to be able to instruct them thoroughly but to insure that the troops are complying with such instruction. He must know the proper method of construction of such installations as gallies, seepage pits, garbage

dumps, and heads, and must be able to intelligently inspect them for proper maintenance. He must be familiar with the use of various compounds for preventive medicine employment such as DDT, insect repellent, and dimethyl-phthalate for impregnation of clothing. Water purification, under all circumstances, must be a part of his learning. The hospital corpsman, himself, is not charged with actually carrying out such sanitary measures, but must be able to supervise and see that personnel so detailed do carry them out.

### *Military Attributes*

To successfully accomplish the purposes for which he is assigned, the hospital corpsman must be aware of those factors that enable him to adjust himself to life in the field and those which aid in preserving his well-being to the end that he may carry out his duties to the fullest extent. They include:

1. *Physical fitness:* The field hospital corpsman must be in the best physical condition that it is possible for him to attain if he is to withstand the grueling days and nights of any prolonged engagement. Short rations, lack of sleep and exposure to the elements in the presence of constant danger will break down the physically unfit individual quickly. Long hours in the shock ward and operating room likewise call for the highest physical stamina.

2. *Terrain appreciation:* This implies the ability of the hospital corpsman to take advantage of whatever terrain features are available in order to provide the maximum protection for his patients and himself. This is especially necessary for the company-aid man to help him in reaching and evacuating to a place of relative safety, the casualty on the front lines. It also is vitally important that all other medical personnel and installations take advantage of whatever protection the terrain offers, both from direct enemy fire and indirect fire such as artillery, mortars, and enemy air activity.

3. *Map reading:* Every field hospital corpsman must be able to accurately read military maps. By use of these maps he can orient himself with the surrounding terrain and more intelligently plan the routes of evacuation. Travel between the various links in the evacuation chain and the search for isolated groups of casualties is greatly dependent on the individuals' ability to read these maps.

4. *Use of small arms:* Under many conditions, the hospital corpsman is called upon to bear arms for the defense of his patients and himself. All men, therefore, must be trained in the care and firing of the pistol and carbine. This training is routinely carried out in marine combat units and hospital corpsmen are entitled to such

emoluments as are rated by marines for qualifying as expert in the use of these arms.

5. *Ability to live in the field under combat conditions:* The hospital corpsman must be able to accommodate himself to his surroundings and make the best of the conditions under which he must function. He must learn to construct fox holes, erect shelter from the elements, employ camouflage, prepare his individual rations, and in many other ways acquire the tricks of the trade. The willingness and courage with which he faces the rigors of field existence will determine, to a large degree, his ability to persevere.

A résumé of the duties of the hospital corpsman in combat with the landing force indicates the need for resourceful, well-trained, and courageous individuals. The corpsman who can successfully carry out these duties may regard his efficient participation with utmost pride and the sense of a job well done. Not only does the opportunity for saving life present itself more frequently in this branch of the service but he has the knowledge of the tremendous morale factor that his presence inspires. The certainty of the fighting man that his aid man accompanies him into battle, shares his dangers and is ever ready to give him quick and competent medical assistance, cannot be overrated as an aid to his willingness to carry on in the face of enemy fire. To the Marine, the hospital corpsman is "Doc," the family doctor, and to fulfill such a position to the utmost of his ability is a calling worthy of the best the hospital corpsman can give.

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## PRACTICAL PREVENTIVE MEDICINE

*Preventive Medicine* is that branch of medical science which seeks to prevent and control disease by eradicating or altering the factors which cause disease. It embraces *hygienic, sanitary, epidemiologic*, and other measures which contribute toward disease prevention and control.

*Hygiene* deals with the proper care of the human body to permit proper functioning of its various organs. Its object is to "render growth more perfect, decay less rapid, life more vigorous, and death more remote." *Personal hygiene* pertains to the individual's care of his own mind and body in order that they may function properly.

*Sanitation* is the proper care of man's environment.

*Epidemiology* is that science which deals with determining, describing, and explaining the distribution and the variations of types of disease, which it is necessary to know in order to properly practice preventive medicine. Hirsch has stated that epidemiology "gives a picture of the occurrence, the distribution and the types of the diseases of mankind, in distinct epochs of time, and at various points of the earth's surface; and, secondly, will render an account of the relations surrounding the individual and determining his manner of life."

The practice of preventive medicine is not confined alone to the prevention and control of the diseases which are communicable from man to man, or from animals or insects to man (by means of microorganisms, bacteria, fungi, or minute animal parasites) but to all diseases with which man is afflicted. The subject thus includes all other fields of medical, surgical, physical, or sociological activity which aid, first, to prevent disease and second, to control its spread.

### Definition of Terms

Before consideration of communicable disease control and preventive medicine measures, a definition of certain terms, used in connection therewith as recommended by the American Public Health Association, will be given.

#### *Source of Infection*

The primary source of most of the communicable diseases is from man to man through the human case or carrier. In certain infections, such as plague, some types of food infections, tape worms,

etc., the source is lower animals which act as the reservoir of infection, or serve as the immediate source from which the infection is transferred to man.

### ***Modes of Transmission***

These may be classified in the following general groups:

#### ***Contact:***

1. Mouth spray or droplet infection. In talking, coughing or sneezing, persons emit from the mouth and nose a fine spray which contains the microorganisms harbored in the mouth, nasopharynx, and respiratory passages. The droplets will remain suspended in the air for varying lengths of time and air currents may distribute them short distances. The radius of droplet infection without air current is 6 or 8 feet.

2. Hands and fingers contaminated with infected secretions are unquestionably the most important agencies in contact infection. They may infect directly or indirectly.

3. Direct approximation of body surfaces of two individuals, such as that occurring during kissing or sexual intercourse.

*Foods* (Including water and ice, milk and dairy products, meat and shellfish, and vegetables).

*Insects* (By mechanical and biological transmission).

*Soil.*

*Fomites* (Linens, dishes, etc., used by the infected person and contaminated with infected discharges).

#### ***Case (Patient or Sick Person)***

A person suffering from a disease in whom the symptoms are sufficient to be clinically recognized.

#### ***Carrier***

A person who, without symptoms of a communicable disease, harbors and disseminates the specific infectious agent of the disease.

#### ***Cleaning***

This term signifies the removal by scrubbing and washing (as with hot water, soap, and washing soda) of organic matter on which and in which bacteria may find favorable conditions for prolonging life and virulence; also the removal by the same means of bacteria adherent to surfaces.

#### ***Communicable Period***

The period or periods during which the etiologic agent may be transferred directly or indirectly from the body of the infected person to the body of another person.

#### ***Contact***

Any person or animal known to have been sufficiently near to an infected person or animal presumably to have been exposed to

the transfer of infectious material directly or by articles freshly soiled by such material.

### **Contamination**

Contamination of a surface (wound) or article (handkerchief) or matter (water or milk) implies the presence of a certain amount of undesirable substance or material, which may contain pathogenic micro-organisms.

### **Delousing**

The process by which a person and his personal apparel are treated so that neither the adults nor the eggs of the varieties of lice that infest man may survive.

### **Disinfection**

The destroying of the vitality of pathogenic micro-organisms by chemical or physical means. When the word "concurrent" is used in qualifying disinfection, it indicates the application of disinfection immediately after the discharge from the body of an infected person of infectious material or the articles soiled with such infectious discharges. When the word "terminal" is used as qualifying disinfection, it indicates the process of rendering the personal clothing and immediate physical environment of the patient free from the possibility of conveying the infection to others, at the time when the patient is no longer a source of infection.

### **Disinfecting**

Any physical or chemical process by which insects or rodents known to be capable of conveying or transmitting infection and living on the body or in and around human habitations may be destroyed upon the person, or his clothing, or his environment.

### **Filtrable virus**

The term "filtrable virus" as defining the etiological agent of certain diseases is used in the sense of a causal agent differentiated from other kinds of infectious agents. (Such as bacteria or protozoa.) Many of these filtrable viruses can be grown *in vitro* in the presence of living susceptible cells, and such cultures regularly will produce typical diseases in animals and in man. The term "filtrable virus" has a significance comparable to that of bacterium, spirochete, or protozoon and is as definite a description of an etiological agent as is the statement that the typhoid bacillus causes typhoid fever. The idea conveyed by the statement that a filtrable virus is the etiological agent is that the cause of this disease is known, even though present knowledge does not permit further precision in distinguishing among filtrable viruses except by reference to the name of the disease produced by each.

### ***Fumigation***

Any process by which the destruction of insects (mosquitoes, fleas, bedbugs, and body lice) and animals (rats) is accomplished by the employment of gaseous agents.

### ***Incubation period***

The period between the time a person is first infected with a communicable disease until the first clinical symptoms appear.

### ***Infected Person***

Includes patients or sick persons, persons with subclinical or inapparent infection, and carriers.

### ***Infection***

The entry and multiplication of the particular pathogen in the body of man or animal. The term "infection" should not be used to describe conditions of inanimate matter such as soil, water, sewage, milk or food which are described under the term "contamination."

### ***Infested Person, Animal, Articles, or Premises***

Infestation of persons and animals includes the lodgment, development and reproduction of insects on the surface of the body or in the clothing. Infested articles or premises are those that harbor or give shelter to insects or rodents capable of carrying disease.

### ***Isolation***

The separating of persons suffering from a communicable disease, or carriers of the infectious organism, from other persons, in such places and under such conditions as will prevent the direct or indirect conveyance of the infectious agents to susceptible persons.

### ***Quarantine***

The limitation of freedom of movement of persons or animals who have been exposed to communicable diseases for a period of time equal to the longest usual incubation period of the disease to which they have been exposed.

### ***Renovation***

Such treatment of the walls, floors, and ceilings of rooms or houses in addition to cleansing, as may be necessary to place the premises in a satisfactory sanitary condition.

### ***Report of a Disease***

The notification sent to the health authorities, and, in the case of communicable diseases in animals, also to the respective depart-

ments of agriculture, who have immediate jurisdiction, that a case of communicable disease exists in a specified person or animal at a given address.

### ***Segregation***

The separation for special consideration, control, or observation of some part of a group of persons from the others to facilitate the control of some communicable disease, particularly for the purpose of separating susceptible from immune persons.

### ***Subclinical or Inapparent Infection***

A person with a subclinical or inapparent infection is one whom the infecting organism, following the period of incubation, affects in so mild or atypical a manner that even though the infection is present it is likely to be unrecognized.

### ***Susceptible***

A person or animal who is not known to be immune to the particular communicable disease in question by natural or artificial means.

### ***Suspect***

A person whose medical history and symptoms suggest that he may now have or be developing a case of some communicable disease. Verification of the suspicion awaits the establishment of the diagnosis by clinical observation and laboratory procedures.

### ***Vector***

A biting insect or arthropod which conveys the pathogenic organism from a person or an animal to another person or animal. The conveyance may be merely by contact with the skin or mucous membrane of the person or by inoculation of the pathogenic matter into or through some part of the skin or mucous surface in the course of biting the person. Mosquitoes, fleas, ticks, mites, flies, may play the role of vectors of various communicable diseases.

### ***Vehicle of Transmission***

Matter (usually inanimate) in or upon which pathogenic organisms are present and survive until there is physical contact with, or ingestion occurs in, a person or persons. Body discharges, including blood, pus, saliva, urine, feces, may contain such pathogenic organisms. Hands, eating and toilet articles, water, air, sewage, milk, other foods, and clothing may be the vehicles of transmission.

### ***Immunity***

The defense mechanism possessed by the body to resist and overcome infection is known as *immunity*. It is the ability of the body to protect itself against injury by harmful bacteria, their poisonous

products (toxins) viruses, and other infectious agents. The blood and lymph plays an important part in this mechanism. The protective function of the blood in immunity is due partly to the blood plasma and partly to the white blood cells.

Any substance which, when injected into an organism, is capable of stimulating the production of a substance antagonistic to the substance injected is known as an *antigen*, and the substance produced is known as *antibody*. When foreign substances such as bacteria or their toxins enter the blood they act as antigens and stimulate the production in the blood plasma of specifically antagonistic antibodies. There are various types of antibodies and they are usually designated according to the manner in which they act against the invading substance. Some of the more important types are: *bacteriolysins*, which kill the bacteria themselves; *agglutinins*, which cause the bacteria to settle together in clumps, *precipitins*, which cause precipitation of the bacteria; and *antitoxins*, which neutralize the poisons produced by bacteria.

Also produced in the blood plasma are substances called *opsonins* which so change bacteria that they can be more easily ingested by the white blood cells (phagocytosis).

Through their power of ameboid movement the white blood cells are able to surround bacteria and ingest and destroy them. Often the white cells are themselves destroyed and the dead ones may be removed by other cells. When killed in large numbers the white cells form a large part of the solid or semi-solid matter called *pus* that is found in an abscess.

Immunity may be *inherent* or *acquired*. *Inherent immunity* is present from birth and is represented best by the immunity of certain animals to specific infections. It is of little practical importance in human beings. *Acquired immunity* is that which results from an attack of a disease, called *naturally acquired immunity* or from inoculation of the individual with vaccines, or similar products and known as *artificially acquired immunity*. Not all diseases confer immunity by their attack nor is it possible to produce artificial immunity to all diseases.

Artificially acquired immunity may be *active* or *passive*. *Active immunity* is that which results from antibodies produced by the individual. *Passive immunity* results from the introduction into an individual of antibodies produced in another individual and is known as passive immunity because the cells of the individual receiving the antibodies played no part in the formation of them.

*Serum sickness* (delayed reaction) and *anaphylactic shock* (immediate reaction) are conditions that may appear in individuals following the injection of serums (containing the desired antibodies) especially those from the horse. These reactions mean

that the patient is hypersensitive to the serum and does not indicate any inherent poisonous property in the antitoxin. In order to prevent anaphylactic shock, all patients should be given an injection of a very dilute portion of the serum into the skin as a test for hypersensitivity before the full dose is administered.

### Personal Hygiene

Hygiene is the science of the preservation of health. Personal hygiene deals with the efforts each individual must exert to keep in good physical, mental, and moral condition and with the precautions he must take to protect himself from disease. The body may be compared to a machine, for example, which must be kept clean, in excellent condition, adjusted, and used in such a way that its service will be long, honorable and faithful, without danger to self or neighbor.

Just as a machine sometimes breaks down in spite of the best of care, so too does illness overtake man. If at any time a man does not feel perfectly well or believes that he may have contracted a disease, he should report at once to the sick bay. Many illnesses can be shortened or arrested and complications avoided by early and correct treatment. Self-treatment should never be attempted since the individual may not only harm himself, by postponing the right treatment, but may even become a source of danger to his comrades. *"A person who treats himself has a fool for a patient!"*

Most diseases are caused by tiny plants and animals so small that they can usually be seen only with a microscope. These disease producing agents are commonly called germs. The usual ways in which germs gain entrance to the body are:

1. In food, drinking water or other liquids.
2. In droplets of moisture or on particles of dust floating in the air breathed.
3. Through the skin. (The germs being injected into the body by the bites of mosquitoes, flies, lice, ticks, or fleas, or introduced through cuts, scratches, or abrasions.)
4. By bodily contact with diseased persons, or with articles which they have contaminated.

### Rules for Avoiding Disease

One of the primary duties of every man is to keep himself physically fit for duty. Much sickness results from persons ignorant or careless of simple rules of hygiene. The development of good habits of personal hygiene are essential for the good health of the individual and for the protection of his comrades.

*Food.*—Do not eat to excess. Food should be well chewed; not eaten in haste. It should be of wholesome quality and of good

variety, including fruits and vegetables. In many foreign lands, sanitation is poor. Food prepared by the natives is likely to carry disease-producing germs. To be safe eat only food prepared in your own messes or in establishments approved by the medical officer. As a rule, hot, well cooked, freshly prepared food can be considered safe. In hot weather cream-filled pastries and puddings should be avoided since these foods are frequently contaminated. Do not eat a heavy meal immediately before a long march, swimming, other strenuous exertions, or prolonged exposure to the sun in hot weather.

*Drinking water*—Drink plenty of water at intervals during the day but do not drink a large amount at one time, especially when overheated by exertion. Do not drink water which has not been certified by a medical officer unless it has been boiled or purified in a water sterilizing bag (Lyster bag). Water from this bag should be taken from a faucet into a cup or canteen. Dipping into the bag or putting the lips to the faucet is prohibited. Salt taken in tablet form or added to water or food when sweating is profuse and prolonged, aids in preventing heat exhaustion and cramps.

*Mess gear*—Be sure that the mess kit, knife, fork, and spoon are thoroughly washed in warm soapy water and rinsed in boiling water after they are used. The cleaned mess gear should be protected between meals from contamination by flies, roaches, dust, or rodents. As an added precaution the gear should be immersed in boiling water immediately before using it again.

*Borrowing*—Never drink from a utensil used by others. Do not exchange pipes, musical instruments (wind), gas masks, handkerchiefs, towels, or shaving outfits.

*Clothing*—Wear clean clothing of proper type and weight for the climate and nature of work. Clothing should not fit tightly. Change shirts, underwear, and socks at least twice weekly; wash them with soap and dry them in the sun, if possible. If water is not available, clothing should be crumpled up, shaken well, and exposed to the sun and air. Change wet clothing (particularly shoes and socks) as soon as opportunity permits. Avoid resting in drafts when perspiring or while clothing is damp. Do not sit or lie directly on damp ground. The head dress must also provide protection for the back of the neck from the hot sun.

*Bathing*—Keep the body clean. Bathe the entire body at least three times each week. Where bathing facilities are not available, scrub the body frequently with a wet soapy cloth, paying particular attention to washing and thoroughly drying the arm pits, crotch, and feet. Fungus infections at these sites can often be avoided by dusting with standard foot powder after the drying.

*Exercise and rest*—Exercise and rest are equally essential. Physical exercise keeps the muscles in tone and increases endurance. Exertion to the point of mild fatigue is wholesome; carried to the point of exhaustion, it is harmful. Rest is essential for restoring muscular and nervous energy. Sleep should be regular, undisturbed, and of sufficient duration to result in a refreshed feeling and relief from fatigue. If sleep fails to relieve the feeling of physical and mental fatigue several nights in a row, the medical officer should be consulted.

*Feet*—Proper care of the feet, and of shoes and socks, will prevent uncomfortable or even crippling conditions, such as infected blisters and severe fungus infections. The important points to be remembered are:

1. Properly fitted shoes and socks.
2. Clean socks and changes of shoes.
3. Frequent (daily) washing of feet followed by thorough drying and dusting with foot powder, particularly about and between the toes.
4. Trim toe nails straight across and keep clean. Never tear a nail.
5. Use of wooden clogs in shower rooms while in barracks.

*Care of the teeth*—Brush the teeth at least twice each day, one of these brushings to occur before going to bed. In cleaning the teeth, brush the inside and outside surfaces away from the gums and toward the cutting surfaces. Promptly remove particles of food from between the teeth, preferably by use of dental floss. Have the teeth inspected twice a year by the dental officer, or immediately for bleeding gums and pain.

*Hands and finger nails*—Always wash the hands with soap and water immediately before meals and after using the toilet. Keep the finger nails clean and trimmed short and smooth. Never bite or tear the nails.

*Hair*—Keep the hair clean and cut short.

*Bowel elimination*—Acquire the habit of having the bowels move regularly once each day or two, and at as nearly the same time as possible. The habitual use of laxatives is condemned. The occurrence of any marked change in bowel habits or bleeding from the rectum should be reported to the medical officer. Any food handler who develops "loose bowels" or "cramps" should report immediately to the medical officer.

*Camp sanitation*—Do not soil the ground with stools or urine. Always use the latrine or night urine can. Never throw pieces of food, empty cartons or other refuse around the camp site or shelter. Such debris draws flies, rats, and other vermin.

*Preparation of beds*—Prepare the beds before dark. In temporary camps or bivouac, elevate the beds if suitable material, such as grass, leaves, or boughs, can be obtained. Raincoats or ponchos

can be used for ground sheets. Where mosquitoes are prevalent put up the net, see that it is free of holes and well tucked in. Kill any mosquitoes found inside before darkness falls. Bedding should be aired in the sunlight as often as practicable.

*Medical attention*—Report without delay to the medical officer in case of diarrhea, persistent constipation, indigestion, or sudden onset of pain in the stomach with nausea or vomiting; under no circumstances treat yourself with a laxative or other medicine.

*Contact with diseased persons*—Avoid all close contact with strangers and persons who appear ill unless duty requires it; the medical officer will instruct you in the precautions to be taken for your protection. Practice and advise others to cover nose and mouth when sneezing or coughing. Avoid crowds when many people are having "colds" and sore throats. Spitting is unnecessary and spreads disease.

*Vermin*—Vermin such as body lice, which live in the clothing rather than on the body, "crabs" (pubic lice) and head lice, are the result of lack of personal cleanliness. They produce itching, discomfort, and disturbed rest in the persons whom they infest. The body louse can transmit serious diseases. Men having a persistent itching on the body or head or who see a louse on themselves or clothing should consult a medical officer at once. It is comparatively simple to destroy them with DDT powder. A clean body and frequent change to clean clothes will in most cases avoid this infestation.

*Avoid Venereal Diseases*—The venereal diseases are almost always contracted by sexual intercourse with an infected person. Only a laboratory examination can determine which person is infected and which is not. The venereal diseases can be severe and result in ill health and unhappiness for years. The only sure way to avoid venereal diseases is to abstain from sexual relations, in other words, by exercising continence. The use of alcohol to the point of intoxication is closely related to venereal disease in that while under its influence a person's better judgment is impaired and the will power to avoid dangerous exposure is destroyed. If continence has failed, report as soon as possible (at least within 2 hours after exposure) for "prophylaxis." This treatment must be carried out thoroughly and the directions followed exactly if its maximum protective value is to be obtained.

*Alcohol*—The use of alcoholic beverages while off duty or ashore is a personal problem. However, the abusive use of alcohol is greatly to be condemned. Under influence of alcohol the brain centers that control reasoning, judgment and self-control, are no longer under restraint. The result is a failure of judgment, failure of moral restraints, a weakening of self respect, and a false con-

fidence in physical and mental ability. In this condition an individual falls an easy prey to those wishing to take advantage of him and is not capable of conducting himself in such a manner as to command respect or of following the simple rules of personal hygiene so essential to his well-being.

*Mental Hygiene.*—Mental attitude has a close relationship to health. The rules, regulations, and recommendations set up by the medical and sanitation officers in regards to immunization, reporting for sick call, malaria prevention, use of water and disposal of wastes, are for the protection of the health of members of the service and should be conscientiously followed by all. The individual in the Navy can improve his personality and strengthen his character by cultivating those habits and thoughts which enable him to make an adequate adjustment to service life.

The well balanced man carefully complies with rules and regulations designed for his protection and that of his mates. His emotions do not rule his behavior. The many annoying and irritating situations which are constantly arising, he pushes aside without worrying or brooding over them, for he has found that upon looking back, they were but trifles. He never gives up when faced with a difficult problem or assignment, for he is certain that with hard work and study, a solution will be found.

One of the attributes of a healthy mind is tolerance of the opinions of others.

To keep the mind in the best of health, one must work and be active. Every person, however, no matter how much he may be absorbed in what he is doing, should have interests outside of his occupation. Recreation and hobbies serve as mental tonics.

Finally a sense of humor, combined with a cheerful and friendly disposition, dispels distressing thoughts, relieves tension and keeps us from taking ourselves and life too seriously.

## Water

Water is a prime necessity of life, as an article of diet, for proper cleanliness of person, clothing, other objects used by man and for other purposes.

A man can go without food for prolonged periods but dies after 4 or 5 days without water.

Water forms the chief ingredient in all body fluids, it helps distribute body heat and regulates temperature by evaporation. Man depends on water for elimination.

Water "washes" the surface of the earth carrying pollution with it and is also contaminated by its use for sewage and waste disposal. Hence, there are "water borne" diseases—typhoid and paratyphoid

fever, cholera and the dysenteries from water polluted with human waste.

On shore not less than 15 gallons of water per man, per day, should be provided. The Bureau of Yards and Docks estimates a use of 125 gallons per man, per day, in designing water systems. The allowance of fresh water for all purposes aboard ship should never be less than 5 gallons per man, per day. If possible all personnel should be allowed sufficient water to meet the requirements of personal hygiene.

### ***Sources of Water Supply***

On shore stations potable water is provided by the Public Works Department but surveillance of quality and advice as to purification is a responsibility of the medical officer ashore as well as at sea. Even when fresh water is obtained by distillation, vigorous boiling sometimes causes overflow into the collecting tank with resultant contamination.

The addition of sufficient amounts of chlorine generally destroys bacterial pathogens and corrects many of the objectionable chemical characteristics. The method of procurement and treatment of water supplies should be closely scrutinized by the medical department.

### **Food**

While food usually is considered in its relation to the maintenance of body health and efficiency it is sometimes injurious to health. Animal foods convey infections or have properties injurious to health more frequently than those obtained from plants. Meat and milk are the principal offenders.

Food may affect health as a result of:

1. Natural poisons contained in it (mushrooms, fish, etc.).
2. Animal parasites or their eggs or larvae contained in or conveyed by foods.
3. Bacteria conveyed by both animal and vegetable foods (tubercle bacilli, typhoid bacilli, streptococci, etc.).
4. Toxins developing in foods as a result of bacterial growth, as botulism.
5. Certain poisons contained (as *solanine* in sprouted potatoes).
6. Poisons accidentally or purposely added (arsenic, lead, acids, insect powders).
7. Amount (too much or too little).
8. Composition (an unbalanced diet).
9. Faulty digestion or disturbances of metabolism.
10. Idiosyncrasy to certain foods.

*Food poisoning* can cause acute attacks of illness in large numbers of men in a short time. The term "food poisoning" is conveniently divided into two groups: food infection and food intoxication. Food infection is usually caused by organisms of the *Salmonella* group but occasionally may be caused by organisms of the *Dysentery* group or others. Food intoxication is due to a specific toxin produced outside the body as is the case with *Clostridium botulinum*. Other organisms cause food intoxication by producing toxins, the exact nature of which is imperfectly understood. These toxins are formed under suitable conditions by staphylococci, streptococci, coliform, proteus, and possibly salmonella organisms.

Food infection is characterized by a sudden onset with headache, followed by nausea, vomiting, diarrhea, abdominal pain or distress, prostration and sometimes fever, commencing from 1 to 24 hours after the ingestion of food. The causative organism may be revealed by examination of the vomitus and feces.

The great majority of outbreaks are caused by meat or meat mixtures. The meat may come from an animal infected during life with a specific organism, or it may come from a healthy animal, infected during the process of slaughtering and handling. Such sources of infections are best controlled by meat inspectors at slaughter houses. Food handlers whose hands are not thoroughly washed after leaving the toilet, or whose hands and arms are infected with boils and other sores are frequent means of conveying contamination to food. Food may also be infected by flies, cockroaches, rats, mice and polluted water, when used in cooking and preparation of food.

Foods which most often cause food poisoning are mixtures with meat as a basis; (such as hash, meat loaf, pie, sea foods, and chicken salads). Veal mixtures are a frequent cause. Milk and milk products also have been reported as causes of outbreaks.

Meat mixtures that have caused trouble have several common qualities: They are cooked, then handled in preparation, and often allowed to stand in a warm place several hours—in some instances over night. If they have been infected with one of the causative organisms, it readily may be seen that with moisture, a good protein food supply and warmth, there is every desirable condition present for a large growth of bacteria and the production of much toxin.

The filling of cream puffs, cream pies, and custards and various sauces made from milk and cream has been the cause of many outbreaks.

It is important to remember that the organisms which cause food infection do not necessarily cause any alteration from the normal appearance, odor, or taste of the food. A classic example

of this occurred in connection with an outbreak in Ghent, Belgium. A meat inspector was so certain that the suspected meat had no connection with the outbreak that he ate three slices to demonstrate their harmlessness. He suffered a severe attack of gastro-enteritis and died 5 days later. *Bacterium enteritidis* was isolated from his viscera at autopsy.

The preventive measures are plainly indicated by the sources of the infection. The ante-mortem sources can be eliminated only by a rigid inspection of animals before slaughtering. Post-mortem sources can be prevented by careful inspection of the slaughtered carcasses for localized infection and the elimination of any suspected meat until it is proved safe by bacteriological examination; also by disinfecting the hands, tools and other objects and surfaces which have been contaminated by infected carcasses in the slaughter house.

On board ship, no food, especially meat mixtures, should be prepared and then set aside to be served at a subsequent meal. The time between the preparation and serving of the food should be reduced to the minimum. If it becomes necessary to hold over any food, it should be put in a cold refrigerator as soon as possible and kept cold until it is to be served or prepared for serving.

A high standard of sanitation in the galley and butcher's shop is very important. The personal hygiene of the cooks and handlers of food should be looked into; particularly, their attention to the important detail of thoroughly washing their hands after visiting the toilet. They should be watched constantly for symptoms of intestinal disturbances and no men allowed to handle or prepare food who are suffering from any degree of diarrhea.

Immediately after an outbreak occurs effort should be made to get samples of the last meal served so that they can be examined in a laboratory. After the rush of cases has slackened, an epidemiological study of the outbreak should be undertaken. The patients should be questioned regarding the foods eaten and the messes to which they were assigned. Unaffected members of the same mess should be interrogated as to whether they ate the same foods. Men frequently eat the same foods, but because of immunity, eating very small portions, an unequal distribution of the infection throughout the food mass, or a different time of eating the responsible food, are not affected.

By careful study one can usually arrive at a fairly accurate idea of the food responsible for the outbreak. Specimens of vomitus, feces, and urine should be collected from as many cases as possible and sent immediately to the nearest hospital or other clinical laboratory, together with samples of the suspected food, for examination.

Food handlers should be brought under observation for medical and bacteriological examination to determine possible origin, whether from infections of the skin or bowel discharges.

Food intoxication follows the ingestion of food containing toxic substances which have been formed by proliferation of bacteria.

The general symptoms of food intoxication caused by other than the *Clostridium botulinum* are shorter-half an hour to 6 hours-vomiting is more violent, and prostration more severe, there is usually less fever and recovery more rapid.

The type of food associated with such outbreaks varies considerably. It usually includes canned or potted meat or fish, pressed tongue, beef, or ham, cheese or milk products.

In outbreaks where demonstrable evidence of salmonella or dysentery infection is absent the laboratory should endeavor to find the presence of toxins of bacterial origin in the food or organisms capable of forming toxic substances.

Botulism is an acute food intoxication due to the toxin produced by the *Clostridium botulism* and is characterized chiefly by oculomotor paralysis, weakness, prostration, incoordination, a variety of central nervous system paralyses, and a high case-fatality rate.

Transmission is only by eating food containing the botulinus toxin. Botulism is usually caused by smoked, pickled, and canned, particularly home-canned foods.

There may be some evidence of spoilage about the infected food but many foods which have produced botulism have been normal in taste, odor and appearance. No suspected food should be tasted. Canned goods which show gas formation, either by the presence of gas bubbles or bulged ends of cans should be destroyed.

## MILK

Milk is man's most important food and one for which there is no effective substitute. For the suckling of the same species it contains all the elements and vitamins necessary for life. But at the same time it (together with its products, particularly cream) is one of the most frequent means of transmission of such diseases as bovine tuberculosis, typhoid and paratyphoid fever, diphtheria, scarlet fever, septic sore throat, undulant fever, dysenteries and diarrhea.

Milk is a natural culture medium for bacteria; it decomposes readily and is probably the most difficult of all foods to obtain, handle, transport, store and deliver in a clean, fresh, and satisfactory condition. The number of bacteria per cc. is the most reliable test to determine its purity. Milk is graded chiefly on its bacterial

content. Today milk is largely consumed in a pasteurized state. All milk for use by naval personnel should be Grade "A" pasteurized milk and delivered in bottles.

Pasteurization is a process by which milk is heated to a temperature sufficiently high to kill harmful micro-organisms but with the least possible effect upon the value of milk as a food. There are two recognized methods of commercial pasteurization, the "holding" method and the "flash" method.

In the holding method of pasteurization every particle of milk is heated to a temperature of not less than 143° F. and held at such temperature for not less than 30 minutes in apparatus of approved design and properly operated. The milk is then rapidly cooled to a temperature of 50° F.

In the flash method of pasteurization every particle of milk is heated to a temperature of not less than 160° F. and held for not less than 15 seconds in an apparatus of approved design and then rapidly cooled to a temperature of 50° F.

Pasteurization may cause a slight reduction in the vitamin content of milk but milk need not be used as a principal source of vitamins.

Contamination of milk with disease-producing bacteria is almost always from human sources. The preventive measures are scrupulous cleanliness in production methods, immediate chilling of milk, and keeping it clean and cold until consumed.

Chapter 19, U. S. Navy Regulations regarding foods and messing sanitation of mess gear and physical examination of food-handlers is of particular interest and should be familiar to every hospital corpsman.

### Waste Disposal

The term "sewage" includes not only human excreta, but other solid and liquid wastes from human habitations and factories; usually it is discharged into sewers. It varies greatly according to time of day, season, and character of the community, but ordinarily it contains about 99.9 percent of water. The remaining constituents include objectionable substances such as floating solids, fats and oil products, settleable solids, putrescible materials, and bacteria.

"Refuse" is a term used to describe all other solid waste matter resulting from the natural activities of a community (garbage, ashes, rubbish, street cleanings, and manure).

Typhoid fever and paratyphoid fever, cholera, dysentery, and hookworm disease are spread by intestinal discharges. The disposal of sewage in such manner that bacteria and parasites which cause these and other diseases are destroyed before they can re-

enter the body in any manner constitutes a real problem in preventive medicine.

*Sewage disposal* methods fall under two general classes:

1. The water-carriage system.
2. The dry system.

The *water-carriage system* is based upon the transfer of the sewage to a large body of water, where final disposition may be accomplished by dilution, or to a place where it may undergo purification processing. A plentiful supply of water is required for flushing purposes.

Dilution is the oldest, simplest, and cheapest method of disposal of sewage. The method is suitable when, by dispersion in water, the impurities are disposed of without nuisance or menace to health. The process of purification depends upon chemical and biological changes which require a sufficient supply of "dissolved" or free oxygen in the water. In general, waters from which living pathogenic bacteria might directly or indirectly gain entrance to human bodies and cause disease are not suitable for use in the dilution method of sewage disposal.

Sewage treatment is necessary when sewage cannot be discharged into bodies of water without endangering health.

Several procedures are employed separately or in combination in the treatment of sewage. Separation and removal of suspended matter are accomplished by:

1. Screens (coarse and fine) to remove matter such as wood, cans, etc.
2. Skimming tanks which provide by flotation for the collection of oil, grease, wood, and other floating matter.
3. Grit chambers for separation of sand, cinders, and other mineral materials.
4. Plain sedimentation separation of solids by retention of sewage to permit clarification by settling out of solids.
5. Sedimentation with chemical precipitation.
6. Filtration and activation.

Destruction or liquefaction of organic solid matter in liquid sewage is accomplished by anaerobic decomposition in:

1. Single-story septic tanks.
2. Two-story digestion tanks of Imhoff or Emscher type.

Transformation of the organic matter to a condition of stability is accomplished by:

1. Irrigation.
2. Sand filtration.
3. Contact beds.
4. Trickling filters.
5. Activated sludge.

Destruction of pathogenic bacteria is accomplished by disinfection with chlorine.

Disposal of sludge is accomplished by:

1. Dilution.
2. Drying on sludge beds or presses.

Single-story septic tanks are flat-bottomed sedimentation compartments fitted with baffles to retard the flow and retain the sewage from 8 to 24 hours. The sludge remains for longer periods. They serve to clarify sewage by sedimentation and to decompose organic solids by anaerobic saprophytes.

Small septic tanks are frequently unsatisfactory because of foul odors from released gases. Digestion also is usually incomplete.

Two-story septic tanks consist of an upper sedimentation compartment and a lower compartment for storage and digestion of sludge. The two chambers are separated by sloping walls which have narrow slots at the bottom to permit settleable solids in the upper compartment to continuously pass into the lower. The gases generated in the sludge are diverted into gas vents and do not pass upward into the sedimentation compartment. Such tanks are called Emscher or Imhoff tanks.

Two-story tanks have proved to be more satisfactory than the single-story type. Under trained and intelligent operation many have produced thoroughly digested sludge without the occurrence of extensive odors. If the effluent from septic tanks cannot be discharged into bodies of water without danger of contaminating water supplies, bathing beaches, or shellfish areas, it must be further purified.

The chief purification methods are:

Contact beds which are constructed of crushed stone, cinders, etc., in series of two or three, the sewage flowing from one bed onto another. Purification is effected by physical oxidation with atmospheric oxygen, sunlight, biological action of aerobic bacteria, animal and vegetable life, and finally filtration.

Intermittent sand filtration beds which are filled with coarse sand over a layer of gravel. The sewage, without any preliminary treatment other than being passed through screening and grit chambers is flowed onto the beds.

Sprinkling filters are beds constructed of crushed stone, cinders, etc. and sewage is applied to them by means of a fine spray from sprinkler nozzles, whereby the sewage is saturated with atmospheric oxygen. Otherwise the purification is substantially the same as occurs in contact beds.

The activated sludge process consists of aeration of sewage in tanks in contact with sludge from previously aerated sewage.

In the Ponding system sewage is permitted to circulate very slowly through very large shallow ponds.

In sterilization of sewage, liquid chlorine is used as in water purification. In the dry system of sewage disposal fecal and urinary matters are collected in pails or water-tight receptacles which are regularly replaced by empty sterilized containers. This system is suitable for isolated houses or small groups of houses and temporary camps where natural drainage is into the public water supply or where there is insufficient water for the water carriage system.

### ***Refuse and Garbage***

Aboard ship dry refuse, such as paper, boxes, etc., is burned in incinerators. Tin cans are punctured and thrown overboard. Wet garbage is discharged over the side through slop chutes.

In port, trash, garbage, and ashes have to be disposed of in lighters provided for those purposes. In navy yards, bins and containers are provided by the yard authorities and the refuse removed by them. Scrupulous cleanliness should be observed with garbage and trash containers to avoid unpleasant odors and attracting flies and rodents. Garbage cans always should be covered tightly.

Refuse ashore is generally estimated at one ton per person per year. It varies according to season and community. Methods of collection and disposal are as follows:

### ***Collection Methods***

*Separate method*, in which wet garbage is placed in one container, trash in another, and sometimes ashes in another.

*Mixed collection*, in which all wastes are placed in one container, the dry matters absorbing the excess liquid.

### ***Disposal Methods***

Garbage is fed to hogs or subjected to reduction. In the latter case, the garbage is boiled in cookers, the fat skimmed off and sold for making soaps, candles, etc.; the tankage remaining in the cookers is dried and sold for making fertilizers. Ashes and noncombustible materials are used for filling.

## NOTES

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## **Insect Control**

For thousands of years there has been a comparative indifference on the part of the human race to the dangers of its association with insects. Man was struggling with insects before the dawn of civilization.

Insects had established themselves long before the advent of man. The struggle will continue as long as the human race endures, but detailed consideration of measures for insect control is required in order that troops may successfully withstand their attacks.

### ***Flies***

The most common diseases transmitted by flies are dysentery, diarrhea, and typhoid fever. Flies may transmit many diseases under the following conditions:

1. By having access to human body discharges (feces, urine, sputum) containing infectious microorganisms;
2. By having access to contagious or infectious materials on the external surface of the body; and
3. By biting and carrying infection from one person or animal to another. (As in African sleeping sickness and tularemia.)

Flies are two-winged insects passing through four stages of development; egg, larva, pupa and adult. The common flies found in naval establishments are the housefly, blowfly and stablefly.

The housefly lays its eggs in vegetable or fecal matter which is about to ferment, grease-soaked soil, decaying bodies, blood, etc. The egg hatches into the larva or "maggot" in 8 hours to 1 day. The larva changes into the pupa in 4 to 8 days and 3 to 5 days later the adult fly emerges from the pupa. The entire metamorphosis requires 7 to 14 days or longer depending on the weather and other conditions. It has been estimated that a single female fly can produce 810 pounds of flies in a single season. The adult fly may travel a mile or more from its breeding place in search of food; it takes only liquid foods and regurgitates in order to dissolve solids, thus causing contamination. Disease organisms are carried on the feet of the fly to food and mess utensils from contact with excrement and other filth.

Blowflies are often found around improperly maintained latrines. They breed in decaying meat and fish and occasionally in animal and human excrement.

The stable fly (dog fly) breeds normally in wet straw, manure and straw, or in rotting vegetation. It is a biting species often mistaken for the housefly. It is not found around latrines but may occur in sufficient numbers to annoy man and animals.

#### *Prevention of fly breeding.*

The measures necessary to control flies lie first in the prevention of access of flies to food, mess gear, kitchens, mess halls, living quarters and excreta. In a permanent camp, the kitchens, mess halls, garbage cans and latrines should be tightly screened. Screens should have a mesh of 18 wires to the inch which also keeps out mosquitoes. In a semi-permanent camp screening may be impractical; consequently, dependence must be placed upon cleanliness and insect-proof containers. In the absence of metal screening, mosquito netting, target cloth, or similar material may be used to flyproof tents, galleys, shacks, etc. Screen doors should be made to open outward, fit snugly, and should be in direct sunlight when practicable.

Fly breeding in human excreta is particularly dangerous, hence latrines, wherever possible, should be carefully flyproofed. In temporary camps, enforcing the use of straddle trenches and the prompt covering of feces are extremely important. Garbage should be kept in covered containers, and should be removed frequently, especially in warm weather. It may be burned, buried, or disposed of at sea some distance off shore. The use of a sanitary fill is an effective method of permanent disposal of inedible garbage, non-salvageable waste, and rubbish. Grease traps must be covered and the surroundings kept clean and dry, or larvae will develop.

#### *Destruction of flies.*

A 5-percent solution of DDT<sup>2</sup> in kerosene or DDT as an emulsion should be applied to all screens on doors and windows with a sprayer or paint brush. The residual DDT thus applied acts as a contact insecticide killing flies for as long as 2 or 3 months. Five-percent DDT in kerosene should be applied in the proportion of 1 quart to 250 square feet to interior surfaces of walls and overheads in latrines, mess halls, barracks, and other places where flies congregate. Residual treatments will be effective for several weeks or months in killing houseflies.

All exposed utensils and food should first be covered and men should wear charcoal-type respirators and gloves. Outdoor surfaces should be treated where flies are very numerous to kill them

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<sup>2</sup> Dichloro-Diphenyl-Trichloroethane.

before they enter the building. This procedure alone may keep the inside free of flies. It may be necessary to repeat this treatment every 2 or 3 weeks. DDT in oil must not be allowed to come in contact with the skin; it is readily absorbed and thus presents a hazard.

DDT is a nervous system poison, primarily of central origin, but can cause damage to other tissues and organs as well. Manure can be sprayed with a DDT-water emulsion in concentrations as low as 0.1 percent to kill any fly larvae which may develop. Residual spray should be applied at the rate of 1 quart of 5-percent DDT to 250 square feet to the ground and enclosures around latrines, garbage racks, and any other places subject to fly breeding. Pit latrines should have spray applied to the walls inside and outside of the pit and box, and the walls and screens of the enclosure.

Xylene-DDT emulsions must not be used in pit latrines or in other closed spaces where explosive concentrations of xylene fumes may be built up. In such situations 5-percent DDT in kerosene or the high-flash-point emulsion (DDT Emulsion Concentrate, Standard Stock No. 51-I-156-50 or 51-I-156-55 in one- and five-gallon containers, respectively) should be diluted and used.

Other methods of fly control which are advantageous are the use of fly sprays containing pyrethrum or lethane, flypaper, poisoned bait, and larval poisons. Sweetened solutions of formaldehyde, 1 percent, or sodium salicylate, 1 percent, will kill flies. These solutions should be placed where food will not be contaminated. Flies usually drink liquids early in the morning.

The stable fly, or dogfly, does not visit human food. In the late summer and fall they frequently occur in large numbers. Annoyance is caused by their bites. Breeding occurs in fermenting accumulations of agricultural litter, hay, and straw and in marine grasses and algae along bays, sounds, and inlets. All deposits of rotting or fermenting vegetation should be treated with 10-percent DDT dust, sprayed with 5-percent DDT solution in oil, scattered and buried or composted and sprayed or dusted with DDT. A solution containing 1½ pounds of paris green, 8 pounds of hydrated lime, and 45 gallons of water may be used or a well-activated mixture containing one part creosote and three parts water. The adults are controlled in buildings in the same manner as houseflies.

### *Mosquitoes*

Mosquitoes rank first among all insects that jeopardize the health of man. The three important genera concerned are *Anopheles*, *Aedes*, and *Culex*. The most important diseases trans-

mitted by mosquitoes are malaria, dengue, yellow fever, filariasis, and encephalomyelitis.

The routine administration of quinine or atabrine as a prophylactic against malaria will retard infection and conserve manpower. The treatment of native malarial carriers is an important factor in the protection of the landing force.

#### *Personal protection:*

Three 2-ounce bottles of insect repellent should be made available to each man per month in malarious areas. Twelve to 15 drops of repellent is placed in the palm of the hand and after rubbing the hands together, an even application is made to all exposed skin surfaces. Care should be taken to avoid mucous membranes. The repellent usually persists for about 3 or 4 hours, but the duration is shortened by such factors as rain and perspiration. Dimethyl phthalate, supplied in 1-gallon containers, may be applied undiluted to clothing with a spray gun.

Clothing may be treated while being worn if the wearer covers his eyes to protect them. Two ounces are sufficient to treat one uniform completely when treated after removal from the body. This treatment prevents mosquito bites through garments for a period of a few days. *Long sleeves and trousers should be the required uniform after sundown in malarious areas.* In addition, headnets, gloves and leggings should be worn. Bed nets must be used by all personnel in areas infested with disease-carrying mosquitoes. Living quarters in permanent or semi-permanent camps should be screened by using wire having 18 meshes to the inch.

In malarious areas, native environs should be restricted from sundown to sunup. Anopheline mosquitoes are mainly night biters. On the other hand, many of the *culicine* vectors of dengue fever and filariasis are daytime biters, and native settlements in which these diseases are prevalent should be avoided at all hours of the day or night.

#### *Adult mosquito control:*

Adult mosquitoes should be destroyed by spraying or painting screens and the interior of quarters as described for the control of flies. Adult mosquitoes in tents, huts, shelters and buildings may be killed through the use of the aerosol bomb. About 4 or 5 seconds' spraying is required for 1,000 cubic feet of space, if the room is not ventilated. Airplane dispersal of DDT solutions is an effective and rapid method of spray killing adult mosquitoes over large areas. The method is particularly useful during the early phases of occupation before organized spray-killing of adult mosquitoes or larvicidal operations on the ground can be initiated. A solution of 10 percent DDT in Diesel fuel oil using an auxiliary solvent generally

gives good control of mosquitoes when applied at the rate of 1 to 2 quarts per acre. The distribution of DDT aerosols (Insecticide smokes) from fast combat planes is also a promising method for rapid elimination of adult mosquitoes from large areas.

#### *Control of immature stages:*

Larvicides often must be relied upon not only during the early phases of a program before drainage and other permanent measures can be initiated, but also for periodic treatment of persistent breeding places. The most efficient larvicide is DDT in oil solution, as an emulsion, or as a dust. One quart of Diesel fuel oil containing 5 percent DDT or 5 quarts of oil containing 1 percent DDT are sufficient to treat an acre of water surface. This rate provides 0.1 pound of DDT to the acre, and is adequate for from 6 to 9 days. The same amount of DDT per acre is required when the emulsion or dust is used. One to two quarts of 5 percent solution (smaller amounts of 10 to 20 percent solution) are required per acre for larval control by aircraft.

Heavy doses of DDT will kill fish and other aquatic forms. Fog generators mounted on trucks or trailers have been used with considerable success in the control of mosquito larvae and adults where areas are accessible to motor vehicles. Diesel fuel oil or Grade F. S. No. 2 fuel oil without DDT may be used for larviciding where DDT is not available although 20 to 30 gallons of oil per acre are needed to form a thin continuous film. The "Panama dripper" consists of an oil can with a faucet near the bottom which allows the oil to fall on the water, drop by drop (usually at the rate of about 30 drops per minute) and permits continuous oiling of a running stream. Drainage and filling are also efficient measures. Where the mosquito breeding area is below sea level and cannot be drained it may be flooded with salt water to prevent breeding. In other areas deep ditches may so reduce the water surface that it may be easily controlled by oiling. Small swamps, marshes and other low areas, may be filled in with dirt, ashes, or other material. Comparatively small amounts of stagnant water in pools, barrels, tin cans or other man-made breeding places, furnish sufficient breeding surface to infest a camp with *Culex* and *Aedes* mosquitoes. In the selection of a camp site, proximity to native habitations should be avoided.

#### *Sandflies*

Besides being a nuisance, sandflies transmit such diseases as Sandfly fever, Leishmaniasis, and Bartonellosis. They are very minute in comparison with the housefly, measuring only 1 to 3 millimeters in length. They are chiefly important because of their provoking bites. Breeding is found in crevices of cement, rock, soil,

boards, moist rubbish, sandbags, cesspools, dead trees, fresh-water inlets, tide-water pools and decaying humus in shady areas edging grassy marshes and mangrove swamps.

Some species of sandflies lay their eggs on mud near water and the larvae burrow into the mud or swim in the water. Protection lies in the use of small mesh screens (18 mesh will not exclude), oiling of screens with lubricating oil, treating of screens with 5 per cent DDT, use of repellents, wearing protective clothing and the use of aerosol bombs. In control, drainage is of value, but the fact that some of the larvae live in the mud makes thorough drying necessary. Breeding places mentioned above may be sprayed with 5 per cent DDT in kerosene. Drainage and harrowing of breeding points in damp soil is advantageous.

### ***Blackflies (Buffalo Gnats)***

These insects bite in the daytime and are sometimes very numerous. They have been associated with the transmission of Onchocerciasis. Blackflies are small gnats, 1 to 5 millimeters long with stout bodies and humpbacks. They breed in rapid running streams or swampy areas where the larvae are either attached to rocks or overhanging limbs which touch the water.

There is no satisfactory method of controlling breeding. The clearing of streams of debris and overhanging branches or the damming up of swift flowing streams to raise the water level above the rocks will reduce populations. Destruction of adults and protection of personnel is the same as recommended for sandflies.

### ***Eye Gnats***

These insects are attracted by blood, excreta and body secretions. They present a hazard in the spread of such infections as conjunctivitis. Eye gnats are very tiny; control of breeding places is not feasible because of the wide variety of locations involved such as decaying vegetable and animal matter. Cleaning up of decaying vegetable or animal matter, proper disposal of human excreta and ploughing or harrowing of soil to produce drying and exposure of larvae to the heat of the sun or cold air is advantageous. The control of adults is the same as for sandflies.

### ***Salt Marsh Sandflies (No-See-Ums)***

Salt marsh sandflies are small, slender gnats, 1 to 3 millimeters long. They are important only as a nuisance; they breed in wet sand and mud around ponds, streams, and swamps (fresh or salt water). They are day and night biters attracted to lights. They have a flight range up to a mile. Control of breeding lies in

drainage of areas having decaying humus. DDT is not considered effective. Protection of personnel and destruction of adults is the same as for sandflies.

### *Lice*

Ten percent DDT powder is more highly effective and longer lasting than any previously known louse treatment. For the body louse the entire inner surface of the undergarments is dusted lightly with special attention being given to the seams. The inner seams of the trousers and shirt should be rubbed slightly by hand to spread the powder more evenly. The application is repeated at 1- or 2-week intervals, depending on the abundance of lice.

For head lice the powder should be rubbed thoroughly into the hair. It should also be dusted in the hat or other headwear. An additional treatment is suggested 1 week to 10 days later to kill the hatching young. Crab lice are killed by dusting the powder over the infested areas rubbing it in thoroughly.

For large-scale control of body lice in clothing, methyl bromide is a very satisfactory fumigant. A knock-down portable fumigation vault of 325 cubic feet capacity, equipped with circulation and exhaust systems, is used. The methyl bromide is introduced from the outside with patented applicators at the rate of three pounds per charge. Clothing and blankets are placed on trucks or on pole-shelves in the vault and fumigated for 45 minutes. Five minutes after the gas has been exhausted from the vault, the clothing may be removed and worn.

Methyl bromide is also supplied in 2-ounce capsules to be used in fumigation of individual barracks bags. The methyl bromide capsules are placed in special, gas-tight bags with the clothing, and capsules are broken by outside pressure. In 45 minutes the clothing is removed and aired. All operations are from the windward side taking care not to breathe the fumes which are *extremely toxic*.

In the absence of DDT or methyl bromide the following methods are suggested: Clothing may be deloused by immersion in kerosene or gasoline taking proper precautions against fire. Ironing of clothes will kill both the adults and the eggs; steam heat will accomplish the same purpose. The "Serbian barrel" and the "sack disinfestor" are two simple methods of using steam heat in the field.

The Serbian barrel disinfestor consists of a barrel with a perforated bottom and a tightly fitting removable cover which is weighted down with stones. The barrel is placed over a tank of boiling water; the steam generated from the boiling water flows under pressure into the barrel. The water must be kept boiling at all times while this barrel is in use. Clothes and other articles may be disinfested by this means.

The sack disinfestor depends on the principle that steam entering the upper portion of the inverted bag displaces the air in its course downward and produces an extra atmospheric pressure (about 15 pounds per square inch) which pressure in turn raises the temperature of the interior of the sack to 107° C. The sack disinfestor is useful for disinfection and disinfestation.

### ***Bedbugs***

The most effective insecticide for the control of bedbugs is DDT. It may be applied as a 5 percent dust, in an emulsion, or in kerosene. Care must be taken to apply the material to bedsteads, springs, mattresses, and to the floors and walls near the bed, especially all crevices in which the bugs may hide during the day. The DDT-kerosene mixture or emulsion (if emulsion is used, ventilation should be quite free) should be applied in a spray in sufficient quantities to obtain a heavy, even deposit of DDT. About three and one-half gallons of spray is required to treat all beds and the side walls of an ordinary 70-man barracks. Barracks so treated have been found to remain free from bedbugs from 4 to 10 months. Smoking should be prohibited during treatment and for 12 hours thereafter. All fires should be put out.

Other measures against bedbugs:

1. Frequent airing of bedding in the sun.
2. Bedbugs and most other pests can be killed by a temperature of 120° to 125° F. This temperature must be maintained for 24 hours.
3. On ships and stations where large sterilizers are available, turned in mattresses and pillows may be run through the sterilizers before being placed in the storeroom. Where there is any indication of vermin in the quarters, all mattresses and pillows should be sterilized periodically.
4. The advent of DDT has made fumigation for bedbug control no longer necessary.

### ***Cockroaches***

There are four domesticated species of cockroaches, namely, the Oriental, German, American, and Australian. All roaches are killed by adequate dosages of DDT. The German roach is more difficult to kill than are most insects. Other roaches are relatively easy to kill. DDT 5 percent in kerosene, oil, or as an emulsion kills roaches by residual action but heavy applications are usually needed.

The solution should be sprayed around pipes, on table legs, in cracks, and in other areas frequented by roaches. DDT 10 percent in talc, as supplied in bulk, should not be diluted. It should be generously applied to cracks and other points inhabited by roaches. The practice of spraying followed immediately by dusting while the surface is still wet usually gives the most satisfactory results.

Proper precautions should be taken against the fire hazard of DDT in kerosene, oil, or emulsion.

Sodium fluoride blown in corners and crevices is also a method for controlling this pest. The use of sodium fluoride is not without danger around a mess hall as it may be mistaken for sodium bicarbonate, baking soda or powdered sugar. It must be used in such a manner that it will be impossible for it to get into food. Pyrethrum has been extensively used as an insecticide for the extermination of cockroaches and other insects. This material is difficult to obtain, expensive in comparison with other materials, and it is no longer used as a standard Navy insecticide. Powdered borax in cracks and crevices frequented by roaches may be effective. Removal of food scraps in order to starve roaches is the best method of preventing an infestation.

### *Fleas*

This insect may transmit plague and murine typhus. Fleas breed on animals and in their habitats. The adults cling to animals and humans where they suck blood. They hide in clothing, cracks, upholstery, and under rugs. Clothing affords a barrier against fleas. Repellents should be used in areas where flea-borne diseases are present. They should be used in the same manner on the skin and clothing as when used against mosquitoes. Rats and other small animals which harbor fleas should be destroyed.

Fleas can be controlled with DDT. A 5 percent solution of DDT in oil should be applied to floors, cracks, baseboards, animal habitats, and on or beneath rugs. Ten percent DDT powder should be used on the concrete or dirt of cellar floors. The powder is also effective when used in rooms, and in rat holes. It should be dusted into the cracks and crevices, and may be used in barns, kennels, and elsewhere where fleas may be found. Sprinkling a flea-infested floor with naphthalene flakes and closing the room for 24 hours is effective.

Dogs may be dusted with about a teaspoonful of DDT powder 10 percent. The dust is rubbed into the hair along the middle of the dog's back killing the fleas and preventing them from returning for a week or more. Oil spray must not be used on animals. DDT can not be used safely on cats as they lick off the poison. Control of cat fleas lies in dusting their houses and beds with 10 percent DDT.

### *Ants*

Prevention of ant infestation lies in depriving them of the food they desire. Cracks and other defects in buildings should be repaired. Control of ants is best obtained by finding and destroying

their nests. For this purpose, pour one of the following into holes, 1 to 2 inches deep, around breeding areas: Carbon disulfide, orthodichlorobenzene, paradichlorobenzene, or boiling water. **CAUTION:** carbon disulfide is explosive, keep away from flame or sparks. The fumes are toxic—avoid inhalation.

Baits such as honey, sugar, or lard, poisoned with sodium arsenite, may be used outside habitations where it is safe from animals or humans. It is a dangerous poison.

Dusting any nests about yards and sidewalks with 10 percent DDT powder will usually stop their activity. Within buildings, 10 percent DDT powder or a 5 percent oil solution dusted or sprayed into cracks and about areas where ants are seen such as around baseboards and surfaces near food supplies, on floors beneath refrigerators, tables, sinks, table legs, etc., will usually control them. Application may be repeated in 2 or 3 weeks if necessary. DDT is not effective against all species of ants.

### ***Ticks***

These insects transmit Rocky Mountain Spotted Fever, relapsing fever, Boutonneuse fever, "Q" fever, and cause what is called "tick paralysis." They cling to bushes, leaves, and grass, attaching to animals or humans in search of a blood meal. Protective clothing is important in avoiding ticks. The collar should be buttoned, high shoes or leggings should be worn, and trousers tucked inside the socks. Never sleep in clothing worn outdoors. Dimethyl-phthallate or other repellents may not be depended upon.

Personnel should pair off and inspect each other every 4 hours, removing ticks by gentle traction (preferably with forceps), application of chloroform, kerosene, repellent, or a lighted cigarette causes ticks to release grasp. Avoid crushing ticks as the body fluid may be dangerous. Mice, rats, and other small animals should be destroyed. In infested areas, dogs and other animals should be excluded. Underbrush, grass, and weeds should be closely cut or burned. The American dog tick may be brought into buildings on clothing, but never becomes established in buildings. Infested dogs may be dusted with about a teaspoonful of 10 percent DDT powder. The brown dog tick sometimes becomes annoying in homes, but is not dangerous to human beings. Ten percent DDT powder is also effective in ridding a dog of this tick.

In the building it may be controlled by spraying with 5 percent DDT-oil solution, in cracks about baseboards, window and door casings, and under rugs. A second treatment may be necessary in 2 weeks. In treating buildings large doses are required. DDT may

not be depended upon to kill ticks in area spraying. However, the U. S. Department of Agriculture, in 1945, reported that 0.5 percent DDT and 2.5 percent soluble fine oil applied at the rate of 3 pounds per acre was effective against the American dog tick.

### ***Insects Infesting Stored Products***

Flour beetles, weevils, bran bugs, and moths often infest stored products. Once the food is badly infested it must be destroyed or discarded. Sprays or powders must not be placed in food packages. Dry packaged goods that are very slightly infested may be well separated and heated in an oven to a temperature of about 135° F. for 30 to 60 minutes. Insect development is halted at temperatures under 44° F.

When an infestation is noted, all packages should be removed and shelves or cabinets thoroughly cleaned. All cracks and shelf space should be sprayed with a 5 percent DDT solution. The spray dries, leaving crystals of DDT which destroy the insects crawling on shelves or walls. The spray must be allowed to dry before packages are replaced on the shelf. This application will not affect the insects already inside packages. Insects can be removed from flour by the use of appropriate sieves; a 10-screen sieve is preferable, as it will remove insect eggs as well as insects. Insect-infested rice can be reconditioned by milling if infestation is not too pronounced. Live insects will leave rice at temperatures over 125° F.

### ***Clothes Moths and Carpet Beetles***

These insects may be killed by spraying a 5-percent solution of DDT on closet surfaces, floors, carpets, around baseboards, or other surfaces where they may be contacted by the DDT. The action of DDT on carpet-beetle larvae is slow, sometimes death does not occur for 10 days to 2 weeks, but the DDT stops them from feeding during this time. In spraying for carpet beetles, particular attention should be given the cracks in flooring.

## **Rodent Control**

Navy rodent-control procedures are directed against the transmission of diseases such as plague, endemic typhus fever, and Weil's disease to naval personnel and against destruction, damage, and contamination of stores by rodents. These objectives are effected by means of ratproofing ships and shore structures, the use of rat guards, proper stowage of food and other stores, poisoning, trapping, and fumigation.

Hospital corpsmen and officers trained in rodent control are to be found in most major naval commands afloat and ashore. Current directives from Chief Naval Operations, BUMED, and from

local commands outline policies in connection with rodent control operations and the handling, use, and stowage of highly toxic rodenticides.

Personnel engaged in rodent-control work soon learn to estimate the extent of infestation aboard ship and on shore by signs left by rodents. These include dirty streaks along rat runways, rodent droppings or fecal pellets, the amount of gnawing through wooden doors, bulkheads and packaged stores, and less frequently, the actual observation of live rats or mice.

Control operations vary with each individual situation. In some cases, trapping is indicated, in others fumigation, in still others ratproofing, and commonly poisoning with one or more rodenticides. In general, it is best to use a combination of several methods.

Trapping is best accomplished by means of snap (guillotine) traps, baited with a food material determined by observation to be attractive to the local rodents. Often traps are used unbaited by enlarging the trigger surface with a piece of light metal or cardboard two to three inches square. In any case, traps should be set in runways, so that rats may be caught while running over the trigger mechanism. Traps should always be secured to a heavy or immovable object to prevent their being dragged away.

Traps may be secured to overhead pipes, among stores, and in innumerable other places where rats are evident. It is frequently desirable, particularly outdoors, to invert a box with two openings, for access and egress, under which a baited trap may be set. Such a box takes advantage of the preference which rats show to eat under cover. Two openings are necessary since rats dislike such a cover unless there is one opening to come in, another to go out. This type of shelter is also used in prebaiting and poisoning discussed in a following paragraph. Cheese ordinarily is not a good bait. Preferred baits are meat, fish, raisins, fleshy food materials which can be securely attached to the trigger. Hair-trigger settings are most successful.

Fumigation of ships with hydrocyanic gas is not permitted aboard U. S. Navy vessels unless accomplished by the U. S. Public Health Service. Fumigation of vessels is seldom necessary and is done only after inspection by the U. S. Public Health Service to determine necessity. It is a dangerous procedure and requires that all hands leave the ship during the operation. Hydrocyanic acid gas does find use in the form of calcium cyanide dust which is blown into rat burrows on garbage dumps and in similar locations by foot pumps or blowers designed for that purpose. In handling cyanide compounds it must be remembered that they are highly toxic to human beings and the gas which is always evolving from these compounds is hydrocyanic acid gas, a deadly poison.

Ratproofing, broadly considered, is any method of construction designed to prevent rats from entering buildings or ships, or to prevent rats from finding nesting and hiding places. Ships with efficient rat guards on all lines attached to shore sometimes destroy their good work by allowing cargo nets and other gear to remain in contact with the shore at night when rats are active. Gangways should be lighted and the gangway watch alert to prevent rats climbing aboard whenever ships are berthed at piers or docks. Cargo, particularly food materials, should be stowed to permit easy inspection and provide the minimum hiding place for rats.

Rodenticides commonly used are red squill, zinc phosphide, "Antu" (alphanaphthylthiourea), sodium monofluoracetate (1080), and strychnine. Red squill is least dangerous to human beings and domestic animals. It acts as an emetic and rats cannot vomit. It is necessary for rats to ingest a relatively large amount of red squill in order to be effective. Zinc phosphide is highly toxic to man, domestic animals, and to rats and must be handled with caution. "Antu" is of particular value against brown rats. It is used at a concentration of 1 percent by weight. Sodium monofluoracetate (1080) is an extremely potent rodenticide and must be handled only by qualified rodent-control officers trained in its use.

All of these poisons may be mixed with baits and set out for rat consumption in carefully selected places. It is advisable to pre-bait with unpoisoned material for several days prior to poisoning to determine:

1. The type of bait most readily accepted by rats.
2. The places where rats come to eat the bait.
3. An estimate of the number of rats.

A careful count of the number of bait pellets distributed and eaten must be made. Careful control of poison materials must be maintained at all times to avoid accidental poisoning of children, natives, and domestic animals. Poison baits commonly used include hamburger, fish, cereals, coconut. See table at end of this section for proper proportions of poison in baits.

Sodium monofluoracetate (1080) is frequently distributed as a solution (15 Grams to 4,000 cc. of water) in small waterproof paper cups. This takes advantage of the fact that rats require a considerable amount of water in order to live. Small cups of "1080" solution placed along runways and a few inches from baseboards in rooms or compartments are more likely to be discovered by rats than if they are distributed indiscriminately. Sodium monofluoracetate and all gear employed in its use must be kept under lock and key and the keys retained in the custody of an officer trained in the use of this highly toxic chemical. It should never be used except by a specially trained officer.

In all rodent-control work familiarity with the habits of the rodents is the key to success. The tastes and the requirements of life for rats are similar to those of human beings. A thorough study of these requirements before deciding on a plan of attack will materially assist in the fight against them.

### *First-Aid Procedures—Poisoning by Rodenticides*

1. Call a medical officer. In the meantime,
2. Induce vomiting;
3. Keep the patient warm and quiet;
4. Administer intravenous fluids.

### *Level Tablespoonful Weights of Solid Poisons for Mixing Poisoned Rat Baits*

Poison	Weight of 1 tablespoon- ful in grams	Percent of poison in bait	Weight of poison to 450 grams of bait	Table- spoons of poison to 450 grams of bait
Alphanapthylthiourea (antu) <sup>1</sup> -----	8.75	1.0	4.6	$\frac{1}{4}$
Arsenious oxide, USP-----	15.55	3.0	14.0	1
Arsenious oxide (micronized)-----	12.32	1.5	7.0	$\frac{1}{2}$
Barium carborate-----	9.38	20.0	113.4	12
Red squill-----	7.35	10.0	50.4	7
Sodium monoflouracetate (1080) <sup>1</sup> -----	4.03	.2	1.0	$\frac{1}{4}$
Strychnine (alkaloid)-----	2.70	.6	2.7	1
Thallium sulfate-----	46.00	1.5	6.9	$\frac{1}{4}$
Zinc phosphide <sup>1</sup> -----	21.28	1.0	4.6	$\frac{1}{4}$

<sup>1</sup> These compounds are most likely to be most successful against rats. Strychnine is more likely to be successful against mice.

## Industrial Hygiene Health Hazards

Industrial hygiene and occupational diseases deal with the hazards involved in carrying on industrial work, and generally speaking, cover diseases which are contracted slowly over long periods of time. Many times they occur without our knowledge because of the insidious ways in which they develop in our daily routine.

Servicemen are exposed to many of the same hazards to which civilians are exposed in their daily work. This was demonstrated not only where we find servicemen and civilians working side by side as in numerous governmental industrial activities, but also aboard ship. For all practical purposes each ship afloat can be considered as a small industrial plant and many, such as tenders, battleships, and carriers, are equivalent to some of our large plants, carrying on such varied industrial operations as foundry work, forging, painting, degaussing, machining, welding, plating, case hardening, and a host of other commonplace industrial operations in order to function routinely.

There are other operations which are carried out by service personnel both in time of war and peace which have associated with them specific hazards. Among them may be listed:

- Gases and fumes generated by explosions or fire:

- Damage or misuse of refrigeration machinery or firefighting equipment containing volatile chemicals.

- Gases generated from internal-combustion engines.

- Use of large quantities of high-octane gasoline containing tetraethyl lead, which, in addition to the ordinary hazard of gasoline, there is the added risk of tetraethyl lead poisoning from the cleaning of storage tanks.

- Cleaning aircraft spark plugs by sandblasting.

- Scraping and wire brushing ships' bottoms, etc.

- Salvage operations and the gases associated with bacterial decomposition in closed spaces.

- More recently, the handling of the numerous fuels and chemicals employed in the operation of guided missiles.

These are but a few cases to show where problems may arise in ordinary naval operations. General awareness of these problems, which are potentially hazardous, can save many lives in emergencies, and can also, if steps are taken in time, avert tragedies entirely. In spite of repeated warnings, which may be issued from time to time concerning the dangers enumerated above, deaths and sick absenteeism are constantly occurring from them among service personnel.

Not only does industrial hygiene concern itself with poisonings which may arise from contact either by inhalation, skin contact,

or ingestion of toxic substances, but it is also concerned with such physical conditions as working in unduly humid, hot, or cold atmospheres, confined spaces, and uncomfortable positions in poor lighting, excessive vibrations, pressures, noises, and radiations.

The introduction of new materials and processes continually into naval usage points to the desirability of obtaining medical opinion wherever possible at the earliest practicable stage so that when the existence of a hazard is known or suspected, the means of prevention and the necessary steps and safeguards can be decided upon.

### ***Methods of Prevention***

There are numerous methods used for the elimination or control of industrial health hazards, among which are—

1. Substitution of a less toxic material whenever possible. When utilizing this principle, always guard against the reverse possibility of substituting a more toxic material.

2. Enclosure of the harmful process by automatic operation, if possible. Sometimes all or part of the operation may be enclosed to permit the escape of atmospheric contaminants.

3. Isolation of the harmful process from the remainder of the plant with special protection for workers necessarily included in the area isolated. This will limit the number of persons exposed.

4. Local exhaust should be used where amenable to the problem to get rid of contaminants at the point of origin. All principles of exhaust engineering should be taken into account to give best efficiency. The air flow to the exhaust duct must include the entire area liberating the contaminant. Position, size, and shape should be such as to trap all contaminant and carry it into the duct and away. Air velocity should be sufficient so as not to allow settling of contaminant. Avoid corners, curves, and irregularities in system as they cut efficiency. Air flow should be away from the breathing zone of the operator.

Advantage should be taken of gravity and heavy fumes, vapors, etc., should be exhausted downward. Always allow a margin of safety to remove the maximum yield of contaminating substance. The disposal of substances exhausted often create quite a problem and the collection by proper systems should be carefully evaluated.

5. General ventilation—sometimes exhaust ventilation or other solution may be impracticable. Heat, humidity, or odors may produce unpleasant or debilitating atmospheres; therefore, general forced ventilation is often necessary or desirable.

6. Use of wet methods (water) are often a great help in keeping down dusts in such operations as grinding, drilling, sweeping, etc.

7. The use of personal protective devices, particularly respiratory protection, must be resorted to at times. While these devices are uncomfortable many times, especially in hot surroundings, they may be the only means of protection for some operations. They should be used only when any of the above means are not utilizable or satisfactory and they should not have to be used constantly.

8. Finally, as a last resort, in some cases it may become necessary to decrease the daily exposure through short work periods. Work under compressed air is an excellent example where schedule of maximum length of shift and length of decompression period for all workmen under pressure have been worked out.

Table of maximum Allowable Concentrations for Daily Exposures of 8 Hours to Some Industrial Materials

<i>Gas or vapor</i>	<i>Parts per million</i>
Ammonia.....	100.00
Amyl acetate.....	400.00
Aniline.....	5.00
Arsine.....	1.00
Benzene.....	100.00
Butyl acetate.....	400.00
Cadmium.....	1.10
Carbon bisulfide.....	20.00
Carbon monoxide.....	100.00
Carbon tetrachloride.....	100.00
Chlorine.....	1.00
Chlorodiphenyls.....	<sup>1</sup> 1.00
Chloronaphthalene.....	<sup>1</sup> 1.00 to 5.00
Chromic-acid.....	1.10
Dichlorbenzene.....	75.00
Dichlorethyl ether.....	15.00
Ether.....	400.00
Ethylene dichloride.....	100.00
Formaldehyde.....	20.00
Gasoline.....	1,000.00
Hydrochloric acid.....	10.00
Hydrogen cyanide.....	20.00
Hydrogen fluoride.....	3.00
Hydrogen sulfide.....	20.00
Lead.....	.15
Mercury.....	.10
Methanol.....	200.00
Monochlorbenzene.....	75.00
Nitrobenzene.....	5.00
Nitrogen oxide.....	10.00
Ozone.....	2.00
Phosgene.....	10.00
Phosphine.....	10.00
Sulfur dioxide.....	200.00
Tetrachlorethane.....	200.00
Tetrachlorethylene.....	200.00
Toluene.....	200.00
Trichlorethylene.....	200.00
Turpentine.....	<sup>1</sup> 15.00
Xylene, coal-tar naphtha.....	1.00
Zinc-oxide fume.....	1.00

<sup>1</sup> Milligrams per cubic meter.

## *Housing, Heating, Ventilation, and Lighting*

The housing of naval personnel constitutes one of the most serious problems with which military and naval sanitarians have to deal, because large numbers of men are brought into close association and there is a tendency, especially in time of war, to "crowd" as many men as possible into barracks and on board ship. Overcrowding is conducive to the spread of disease and the dissemination of vermin. Under the close association of barracks life, or life aboard ship, the types of bacteria found in the nose and throat tend to become uniform among the personnel through the agency of the "droplet spray" issuing from the mouths and noses of persons when talking, laughing, coughing, and sneezing.

For housing in barracks sanitary standards require that there shall be a minimum per man of 50 square feet of floor space, 450 cubic feet of room space, and 5 feet of distance between the heads of sleeping men. Large barracks should at least be divided into compartments to house occupants more or less separately in groups as small as consistent with military and administrative requirements. No barracks room should house more than 50 men.

### *Heating*

There are three methods in common use for heating compartments or rooms:

1. Direct heating, effected by radiators, stoves, or open fires, in which heat rays progress directly from their source.
2. Indirect heating effected by supplying the compartment with pre-heated air.
3. Direct-indirect heating, a combination of the first two.

In modern capital ships the indirect, or the direct-indirect system is used. Regardless of the system used, living rooms and compartments should be kept at a temperature of between 65° and 72° F. When indirect heating is used, precautions must be taken to supply sufficient humidity or moisture to the air by passing it through a steam chamber or by evaporation from a pan of water in the case of hot-air furnaces.

The so-called "air conditioning" is used more extensively each year. It often simply consists of cooling the air supply, but may include cooling, drying, removal of dusts and objectionable gases, and the addition of oxygen as well as circulation of the air by fans. In sealed compartments, submarines and in sick bays in tropical climates "air conditioning" is particularly desirable.

### *Ventilation*

Air is an absolute necessity of life. It is not a fixed chemical but a mixture of gases, being about one-fifth or 20 percent oxygen and

about four-fifths or 80 percent nitrogen; argon, helium, krypton, neon xenon, hydrogen, hydrogen peroxide, ammonia, and ozone are present in air but total less than 1 percent. Carbon dioxide is present in fresh air in the proportion of about 0.03 percent. It increases the replacement of oxygen as air is rebreathed in support of life. The presence of carbon dioxide is important in the blood to regulate respiration and heart action, but its increase in the air indicates pollution and poor ventilation.

Carbon monoxide, not normally found in fresh air, is formed by incomplete combustion in indoor stoves, and in gasoline engines. It is an actively poisonous gas uniting with the hemoglobin of the blood to prevent its taking up of oxygen.

Ventilation is the process by which the air of compartments which has become vitiated by human and animal occupancy or manufacturing processes and machinery is diluted and replaced by fresh air of proper chemical composition. Satisfactory ventilation should:

1. Dilute and replace polluted and vitiated air in compartments with pure air.
2. Maintain a temperature within the compartment of from 60° to 72° F., according to the activity of the occupants; and a relative humidity of about 50.
3. Keep the air in gentle continuous motion.

Any system of ventilation should supply each occupant with between 2,500 and 3,000 cubic feet of pure air per hour. A properly designed system will allow six complete changes of air each hour. Ventilation methods are classified as *natural* and *artificial*.

Natural ventilation ashore is carried out by proper manipulation of doors, windows, transoms, and other openings admitting fresh air from without. Such openings are best situated on opposite sides of the rooms and may be assisted by window ventilators, ridge ventilators, etc.

As in buildings natural ventilation of ships takes place through all openings in the sides of ships and those leading from the "top-side" to the decks below. It may be assisted by scoops in air ports, wind sails and screens.

Artificial ventilation of ships and buildings is accomplished by the use of three systems:

1. The *supply* or *plenum* system in which supply blower fans suck in fresh air from the outside and force it either directly or through ducts into the compartments. This system is most used and depends upon diluting and replacing foul air which escapes through natural openings as doors and windows or air ports.

2. The *exhaust* system in which an exhaust blower draws out the foul air from a compartment so that fresh air enters through natural openings.

This system is used in "heads," galleys, and other places where air is heavily polluted by smoke, odors, dusts or gases.

3. The *combined supply and exhaust* system, utilizing both types of blowers, is necessary for fire-rooms, sick-bays on shipboard and spaces where temperature control and removal of polluted air are of special importance.

Discomfort, symptoms of heat exhaustion, or heat stroke, and what is called "crowd poisoning" result under the following conditions, which constitute a summary of the effects of the physical properties of air:

1. When the temperature of the air is so high that the body cannot eliminate its excess heat;

2. When the relative humidity is so high that perspiration cannot be evaporated from the surface of the body with a consequent cooling effect; and

3. When there is no movement of air to remove the hot, moist, blanket of air which accumulates about the body, and stimulates the heat regulating center in the medulla.

The limits of temperature, humidity, pressure, and pollution which can be tolerated comfortably are not always the limits of healthful tolerance; for example, low pressures of high altitudes or concentrations of gases or dust particles in the air might endanger life without any warning discomfort, and healthful conditions might seem unreasonably cold, hot or "stuffy."

### *Lighting*

Light may be natural—that emanating from the sun, or artificial—that produced by various kinds of illuminants, such as gas, oils, electricity, etc. Natural light provides illumination and also has marked stimulatory effects on life processes. Artificial light is generally used for illuminating purposes, but some forms, such as ultra-violet and infra-red have marked chemical and therapeutic effects and are used in medicine and science. Colored lights influence the emotions, green being neutral and soothing, while red and violet are stimulating.

#### *Natural lighting:*

The standard for natural light in buildings is one square foot of window space to 5 square feet of floor space. Roughly there should be one moderate-sized window for each bed in barracks and hospitals. There should be plenty of sunshine in sick spaces even if the patients have to wear tinted glasses to eliminate the effect of glare on the eyes. The most suitable colors for ceilings and upper walls are white or light buff, for lower walls the lighter combinations of green and yellow. Dark colors should not be used for this purpose.

### *Artificial lighting:*

There are two general methods of artificial lighting or illumination.

1. Direct.
2. Indirect.

In the direct method of lighting the light rays progress directly from their visible source. The disadvantages of glare, shadows and unequal diffusion of light.

In the indirect method of lighting, the lights are concealed behind a screen. The light is thrown by a reflector against a light surface (usually the ceiling), which reflects and diffuses the light more evenly throughout the room producing a soft, pleasing illumination without glare. This form of lighting is more expensive, however, and a combination of direct and indirect lighting is usually used.

In living spaces, wards and sick rooms there should be plenty of light where it is needed. The light should come from the back or sides and be so located as to prevent shadows or bright lights in the field of vision. The amount of light falling on a surface is usually measured in foot-candles, one foot-candle being the amount of light falling on a surface one foot away from a standard candle. For ordinary reading 10 to 20 foot-candles should fall on the surface of the book or paper, depending upon the color of the paper and other factors. For very fine or exacting work 100 to 200 foot-candles should be available.

Eyestrain is produced by excessive light and brilliant points of light in the field of vision, flickering or irregular light, and insufficient light, especially when reading, writing or performing work requiring continuous or exacting use of the eyes. Continued use of strained eyes may lead to permanent damage to the eye as well as reflex troubles, such as headaches, indigestion, lassitude and styes.

Blank lined paper.

## Incubation Periods

Actinomycosis.....	Undetermined.
Angina, Vincent's.....	Do.
Anthrax.....	1 to 5 days.
Ascariasis.....	Worms reach maturity in body about 2 months after infection.
Bartonellosis.....	Oroya fever stage 16 to 22 days. Verruga peruana probably 1 to 2 months.
Catarrhal fever.....	1 to 3 days.
Cerebrospinal fever.....	Usually 7 days.
Chancroid.....	Usually 3 to 5 days.
Chickenpox.....	2 to 3 weeks.
Cholera.....	2 to 5 days.
Coccidioidomycosis.....	1 to 3 weeks for the valley fever form. Undetermined for granulomatous type.
Dengue.....	5 to 6 days.
Diphtheria.....	2 to 5 days.
Dysentery, amoebic.....	Commonly 3 to 4 weeks.
Dysentery, bacillary.....	Usually 2 to 4 days.
Encephalitis, acute infectious.....	4 to 21 days.
Erysipelas.....	1 to 3 days.
Favus.....	Undetermined.
Filariasis.....	1 month to several years.
Fungus infection of the skin.....	Undetermined.
German measles.....	Usually about 16 days.
Glanders.....	1 to 4 days.
Gonorrhea.....	Usually 3 to 5 days.
Granuloma inguinale.....	A few days to 2 or 3 months.
Hepatitis, acute, infectious.....	21 to 35 days.
Hookworm disease.....	Onset of symptoms varies according to intensity of infection.
Impetigo contagiosa.....	Usually 2 to 5 days.
Influenza.....	1 to 3 days.
Jaundice, epidemic (Well's disease). ..	Average 9 to 10 days.
Leishmaniasis.....	A few weeks to many months.
Leprosy.....	1 to several years.
Lymphogranuloma venereum.....	A few days for initial lesion; 10 days to 2 months for later stages.
Malaria.....	Varies with species and intensity of infection. Usually 11 to 13 days in <i>vivax</i> and <i>falciparum</i> ; 4 to 5 weeks in <i>malariae</i> malaria (intrinsic incubation periods).
Measles.....	About 10 days from exposure to onset of fever. 2 to 4 days more to appearance of rash.
Mumps.....	Usually 18 to 21 days.
Onchocerciasis.....	Several months.
Paratyphoid fever.....	1 to 10 days.
Pediculosis.....	Lice hatch in a week and reach sexual maturity in 2 weeks.
Plague.....	Bubonic: 2 to 10 days, generally 3 to 4 days; pneumonic: 1 to 2 days.
Pneumonia, atypical.....	Believed to be 1 to 3 weeks.

Pneumonia, lobar.....	Probably 1 to 3 days.
Poliomyelitis.....	Considered to be 1 to 2 weeks.
"Q" fever.....	13 to 18 days.
Psittacosis.....	6 to 15 days.
Rabies.....	Usually 2 to 6 weeks. May be more prolonged.
Rat bite fever.....	Usually 1 to 3 weeks.
Relapsing fever.....	Average about 7 days.
Rocky Mountain spotted fever....	3 to 10 days.
Sandfly fever.....	Usually 3 to 4 days.
Scabies.....	Itching and scratching may occur within 1 to 2 days.
Scarlet fever.....	2 to 5 days.
Schistosomiasis.....	Itching at time of penetration. Ova found in urine or feces in 1 to 3 months.
Smallpox.....	Commonly 12 days. Mild cases may have longer period.
Syphilis.....	Usually about 3 weeks.
Tetanus.....	Commonly 4 to 21 days. May be longer.
Trachoma.....	Undetermined.
Trench fever.....	Usually 10 to 20 days.
Trichinosis.....	Usually 6 to 7 days.
Trypanosomiasis.....	About 7 to 14 days.
Tsutsugamushi.....	2 to 3 days to development of local lesion followed in a few days by general symptoms.
Tuberculosis.....	Variable.
Tularemia.....	Usually 3 to 5 days. May be shorter with heavy infection.
Typhoid fever.....	Usually 7 to 14 days.
Typhus, epidemic.....	Commonly 12 days.
Undulant fever.....	Usually about 14 days. May be as long as 2 months.
Whooping cough.....	7 to 10 days.
Yaws.....	3 weeks to 3 months.
Yellow fever.....	3 to 6 days (intrinsic incubation period).

# Summary of Communicable Disease Control and Immunization Procedures

## (Preventive Measures)

### *Actinomycosis*

#### *Measures applicable to patient:*

1. Recognition by clinical manifestations confirmed, if possible, by microscopic examinations of discharges from lesions.
2. Isolation: None.

#### *Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None.
3. Instruction regarding oral hygiene.

#### *Measures of disinfection and environment:*

1. Concurrent disinfection of lesions and articles soiled therewith.
2. Terminal disinfection by thorough cleaning.

### *Angina, Vincent's (Stomatitis; Gingivitis)*

#### *Measures applicable to patient:*

1. Recognition by clinical manifestations with or without bacteriologic confirmation.
2. Isolation: During period of acute infection, especially when complicated by pharyngeal infection.
3. Correction of abnormal or diseased conditions of gums and teeth.
4. Instruction in regard to diet (particularly in reference to vitamin C), gum massage, use of dental floss and the tooth brush.

#### *Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None.
3. Inspection of mouth and throat.
4. Correction of abnormal or diseased conditions of gums and teeth.
5. Instruction in regard to diet (particularly in reference to vitamin C), gum massage, use of dental floss and the tooth brush.

#### *Measures of disinfection and environment:*

1. Check on efficacy of dish washing facilities.
2. Mess gear must be thoroughly sterilized.
3. Check against possible use of common drinking cup.
4. Concurrent disinfection: All discharges from nose and throat.
5. Terminal disinfection: None.

### *Anthrax*

#### *Measures applicable to patient:*

1. Recognition by clinical and, if possible, bacteriologic means.
2. Isolation: Until the lesions have healed. (Man-to-man transmission is rare.)

*Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None.
3. Check for the possibility of contact with infected hides, wool, hair, bristles or contact with discharges of lesion.

*Measures of disinfection and environment:*

1. Concurrent disinfection: Sanitary disposal of feces and washing hands in soap and water after defecating and before eating. Sanitary disposal of discharges from lesions and articles soiled therewith.
2. Terminal disinfection: Thorough cleaning.
3. Protection of food and water supplies.
4. Sterilization of infected hides, etc.

***Bartonellosis (Oroya Fever)***

*Measures applicable to patient:*

Recognition by clinical manifestations and, if possible, blood culture and identification of organism in stained blood films.

*Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None.

*Measures of disinfection and environment:*

1. Concurrent disinfection: None.
2. Terminal disinfection: None.
3. Sandfly infested areas should be avoided insofar as possible, especially after sunset.
4. Electric fans placed at door opening will aid in preventing entrance of flies.
5. Repellents may be helpful.

***Catarrhal Fever (Including: Bronchitis, acute; Common Cold; Laryngitis, acute; Pharyngitis, acute; Rhinitis, acute; Tracheitis, acute; and Tracheobronchitis, acute)***

*Measures applicable to patient:*

1. Recognition by clinical manifestations.
2. Isolation: During febrile period.

*Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None.

*Measures of disinfection and environment:*

Concurrent disinfection of the discharges from the nose and throat and articles soiled therewith.

***Cerebrospinal Fever (Meningitis, Meningococcic)***

*Measures applicable to patient:*

1. Recognition by clinical manifestations, confirmed, if possible, by microscopic and bacteriologic examination of spinal fluid as well as bacteriologic examination of nasal and pharyngeal secretions.

2. Isolation: Until end of febrile stage, or until negative swab cultures are obtained from the nasopharynx.

3. Prompt treatment with an appropriate chemotherapeutic agent such as sulfadiazine should be useful in limiting communicability.

*Measures applicable to contacts:*

1. Quarantine: None.

2. Advise contacts to avoid excessive chilling, bodily fatigue and physical strain as far as possible for 10 days.

3. Prophylaxis: Give all contacts 2 Grams of sulfadiazine daily for 3 days.

4. Immunization: None.

*Measures of disinfection and environment:*

1. Concurrent disinfection of the discharges from the nose and throat and articles soiled therewith.

2. Terminal disinfection: Thorough cleaning.

3. Increases separation of individuals and discourage crowding.

4. Improve ventilation of sleeping and living quarters.

## **Chancroid**

*Measures applicable to patient:*

1. Recognition by clinical manifestations and exclusion of syphilis and *lymphogranuloma venereum*. Hold without medications until three negative darkfield examinations, carried out on successive days, have been obtained. Frei test for *lymphogranuloma venereum* if possible, Serologic test for syphilis and repeat every month, for 6 months after healing of lesions.

2. Isolation: Place under venereal quarantine and refuse all liberty until lesions heal.

3. Education: Stress fact that continence is compatible with health and normal development; that prophylaxis is available and advisable if self-control fails and promiscuous sexual intercourse occurs.

4. Proper treatment with saline dressings alone the first 3 days followed by appropriate chemotherapeutic agents, such as sulfathiazole or sulfadiazine should render a patient noninfective in 14 days in most instances. Marked phimosis or paraphimosis may be treated by immersion in warm saline solution. Circumcision or dorsal split is undesirable and is rarely necessary at this time. The inguinal bubo should never be incised. If fluctuation is present, aspiration with a sterile needle and syringe may be made.

*Measures applicable to contacts:*

1. Quarantine: None.

2. Immunization: None.

3. Report all sex contacts for past 2 weeks to the health department concerned on the Venereal Disease Contact Report so that the contacts may be located and treated if necessary, and further spread of infection prevented.

*Measures of disinfection and environment:*

1. Concurrent disinfection: Sanitary disposal of all dressings and disinfection of all articles soiled by discharges.

2. Terminal disinfection: None.

3. Check against the common use of towels and toilet articles.

4. Repression of prostitution.

5. Increased education in the home, school and churches in the community.

6. Reducing the reservoir of infection by adequate case finding in the civilian community.

7. Provide adequate social, welfare and recreational facilities.

8. Improvement of conditions adversely affecting morals and welfare of personnel.

9. Reducing promiscuity by social redirection and rehabilitation.

### ***Chickenpox***

#### *Measures applicable to patient:*

1. Recognition by clinical means only. (Be meticulous to eliminate the possibility of smallpox).

2. Isolation: From all nonimmunes until all blebs are dried but not necessarily until all scabs are shed.

#### *Measures applicable to contacts:*

1. Quarantine: None.

2. Immunization: None.

3. Observation every second day of all nonimmune contacts through a period of 21 days.

#### *Measures of disinfection and environment:*

1. Concurrent disinfection: Articles soiled by discharges from lesions.

2. Terminal disinfection: Thorough cleaning.

### ***Cholera***

#### *Measures applicable to patient:*

1. Recognition by clinical symptoms confirmed, if possible, by bacteriologic examination of stools.

2. Isolation: In sick bay or screened room for 7 to 14 days and until cholera vibrios are absent from bowel discharges.

#### *Measures applicable to contact:*

1. Quarantine: Close contacts for 5 days from last exposure, or longer if stools, are found to contain the cholera vibrio.

2. Immunization: Prophylactic reimmunization of ship's personnel with 1 cc. "booster dose" of cholera vaccine. Those not previously immunized should have the full course of immunization.

#### *Measures of disinfection and environment:*

1. Concurrent disinfection: Prompt and thorough disinfection of stools and vomitus. Disinfection of articles used by or in connection with the patient should be burned.

2. Terminal disinfection: Thorough cleaning of the entire room and the contents.

3. Search for unreported cases or carriers particularly among food-handlers.

4. Investigate water, milk, food. Chlorinate all water; cook all food.

### ***Coccidioidomycosis (Coccidioid granuloma; Valley Fever)***

#### *Measures applicable to patient:*

1. Recognition by clinical manifestations confirmed by bacteriologic examination, if possible, of the fresh discharges.

2. Isolation: None.

*Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None.
3. Instruction regarding the importance of obtaining prompt treatment of all skin wounds—even trivial ones.

*Measures of disinfection and environment:*

1. Concurrent disinfection: All discharges from skin lesions or necrotic lymph nodes and all sputum and articles soiled therewith.
2. Terminal disinfection: Not important.

***Dengue (Break-Bone Fever)***

*Measures applicable to patient:*

1. Recognition by clinical manifestations.
2. Isolation: In sick bay or screened quarters for 5 days.

*Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None.

*Measures of disinfection and environment:*

1. Concurrent disinfection: None.
2. Terminal disinfection: None.
3. Search for unreported or undiagnosed cases.
4. Measures to eliminate the *Aedes aegypti* mosquito and its breeding places.
5. Screening with wire screens, 18 mesh.

***Diphtheria***

*Measures applicable to patient:*

1. Recognition by clinical symptoms with confirmation, if possible, by bacteriologic examination of naso-pharyngeal swabs.
2. Isolation: Until 2 cultures from the throat and 2 from the nose, taken not less than 24 hours apart, fail to show the presence of diphtheria bacilli. Where termination by culture is impracticable, terminate at 16 days after onset. Penicillin may shorten isolation period.

*Measures applicable to contacts:*

1. Quarantine: All contacts who handle food until shown by bacteriologic examination not to be carriers.
2. Observation: Daily for 15 days following last exposure.
3. Immunization: All Shick-positive contacts should be actively immunized with plain toxoid. (In order to minimize local constitutional reactions, it is desirable to make a preliminary toxoid reaction test—"reactors" to receive multiple small doses of suitably diluted toxoid.)

*Measures of disinfection and environment:*

1. Concurrent disinfection: All articles soiled by discharges from patient and all articles that have been in contact with patient.
2. Terminal disinfection: Thorough cleaning or renovation and thorough airing and sunning of the sick room.

## ***Dysentery, Amoebic***

### *Measures applicable to patient:*

1. Recognition by clinical symptoms confirmed, if possible, by microscopic examination of stools.

2. Isolation: None. (Patients should be instructed regarding hand washing and forbidden to handle food to be eaten by others until repeated microscopic examinations of stools shows absence of the *Endamoeba histolytica*.)

### *Measures applicable to contacts:*

1. Quarantine: None.

2. Immunization: None.

3. Microscopic examination of stools of close associates of patient.

### *Measures of disinfection and environment:*

1. Concurrent disinfection: Sanitary disposal of bowel discharges. Hand washing after use of toilet.

2. Terminal disinfection: Thorough cleaning.

3. Search for direct contamination of water and food by human feces.

4. Check against possibility of water pollution by cross-connection and back-flow connection.

## ***Dysentery, Bacillary***

### *Measures applicable to patients:*

1. Recognition by clinical symptoms and confirmation, if possible, by laboratory tests.

2. Isolation: During acute phase of disease and until the dysentery bacilli are absent from the bowel discharge. Food handling forbidden until stools are negative.

3. The use of appropriate chemotherapeutic agents such as sulfaguana-dine, sulfadiazine, or streptomycin should aid in reducing the communicability.

### *Measures applicable to contacts:*

1. Quarantine: None.

2. Immunization: None.

3. Sulfadiazine prophylaxis, 1 Gram daily to those exposed.

### *Measures of disinfection and environment:*

1. Concurrent disinfection: All bowel discharges. Handwashing after use of toilet.

2. Terminal disinfection: Thorough cleaning.

3. Search for contamination of water, milk, and food by human feces.

4. Fly-control measures.

## ***Encephalitis, Acute, Infectious***

### *Measures applicable to patient:*

1. Recognition by clinical symptoms assisted by microscopic and serological tests of blood serum, if possible.

2. Isolation: During the febrile period with protection from mosquitoes.

### *Measures applicable to contacts:*

1. Quarantine: None.

2. Immunization: None.

3. Search for unreported cases among shipmates.
4. Observation of close contacts every 2d day for 21 days.

*Measures of disinfection and environment:*

1. Concurrent disinfection: Discharges from the nose, throat and bowel, and articles soiled therewith.
2. Terminal disinfection: None.
3. Take such steps as are practicable in controlling or preventing contact with mosquitoes.

**Erysipelas**

*Measures applicable to patient:*

1. Recognition by clinical manifestations confirmed, if possible, by bacteriologic means.
2. Isolation: Until lesions are completely healed.
3. The use of sulfonamides or penicillin may reduce the communicability.

*Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None.

*Measures of disinfection and environment:*

1. Concurrent disinfection: Discharges from lesions and articles soiled therewith.
2. Terminal disinfection: Thorough cleaning.

**Favus**

*Measures applicable to patient:*

1. Recognition by clinical manifestations confirmed, if possible, by microscopic examination of crusts and cultures on Sabouraud's medium.
2. Isolation: Until the skin and scalp lesions are healed and microscopic examination is negative. The patient should wear a tight-fitting cotton skullcap which should be changed frequently and boiled.

*Measures applicable to contacts:*

1. Quarantine: None.

**Filariasis (Mumu)**

3. Instruction of contacts to report the occurrence of any scalp lesions to the medical officer.
4. Search for unreported and unsuspected cases among immediate associates.

*Measures of disinfection and environment:*

1. Concurrent disinfection: Toilet articles of the patient.
2. Terminal disinfection: None.
3. Prohibit the common use of hair brushes and combs.

**Filariasis (Mumu)**

*Measures applicable to patient:*

1. Recognition by clinical manifestations; confirmation is rare in the early stage by finding embryos in the blood and only a year or more after the initial symptoms have occurred.

2. Isolation: Not practicable because of prolonged period of communicability. Patient should be made inaccessible to mosquitoes.

*Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None.

*Measures of disinfection and environment:*

1. Concurrent disinfection: None.
2. Terminal disinfection: None.
3. Anti-mosquito measures against certain species of *Culex*, *Anopheles*, *Aedes*, and *Mansonia*; protection of all sleeping quarters with an 18-mesh screen.
4. Avoidance of infected native populations in selection of camp sites.

**Fungus Infection, Skin (Ringworm)**

*Measures applicable to patient:*

1. Recognition by clinical manifestations.
2. Isolation: Severe cases should be excluded from common bathing facilities until condition is reasonably well cleared.

*Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None.

*Measures of disinfection and environment:*

1. Concurrent disinfection: Cleanliness of body and underclothes. Use of cotton socks that can be boiled. Use of standard foot powder on feet and in shoes. Disinfection of shoes with formaldehyde.
2. Terminal disinfection: None.
3. Survey of common bathing facilities to assure that all precautions are being taken.

**German Measles (Rubella)**

*Measures applicable to patient:*

1. Recognition by clinical manifestations.
2. Isolation: From onset of catarrhal symptoms or rash, until disappearance of rash.

*Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None.
3. Nonimmune contacts of first cases should be observed every second day (particularly looking for post-auricular nodes) for 21 days from the last day of exposure. Observation of contacts when the disease is epidemic is probably futile.

*Measures of disinfection and environment:*

1. Concurrent disinfection: All articles soiled with the secretions of nose and throat.
2. Terminal disinfection: Thorough cleaning.

## **Glanders**

### ***Measures applicable to patient:***

1. Recognition by clinical manifestations, followed if possible, by the complement fixation test, the mallein test, the agglutination test or the Straus reaction, and confirmation by culture and identification of *Bacillus mallei*.

2. Isolation: Until the bacilli disappear from discharges or until lesions have healed.

### ***Measures applicable to contacts:***

1. Quarantine: None.

2. Observation of close contacts daily for 5 days.

3. Immunization: None.

### ***Measures of disinfection and environment:***

1. Concurrent disinfection: Discharges from patient and articles soiled therewith.

2. Terminal disinfection: Thorough cleaning.

3. Search for any direct or indirect contact with infected horses.

## **Gonorrhea**

### ***Measures applicable to patient:***

1. Recognition by clinical manifestations; confirmed, if possible, by bacteriologic examinations. In absence of laboratory facilities, treatment of acute purulent urethral discharges should begin by first procuring a smear for subsequent examination.

2. Isolation: Place under venereal quarantine and refuse all liberty until discharges disappear.

3. Patient instructed regarding care of hands and discharges until declared cured. Caution against common use of towels and toilet articles. *Extreme care should be exercised to prevent gonococcal ophthalmia.*

4. Education: Stressing that continence is compatible with health and normal development; that prophylaxis is available and advisable if self-control fails and promiscuous sexual intercourse occurs.

5. Prompt and adequate treatment with penicillin should effect a "cure."

6. Adequate follow-up with monthly serologic test for concomitant syphilis for 6 months.

### ***Measures applicable to contacts:***

1. Quarantine: None.

2. Immunization: None.

3. Report all sex contacts for past 2 weeks to the health department concerned on the Venereal Disease Contact Report so that contacts may be located, and further spread of infection prevented.

### ***Measures of disinfection and environment:***

1. Concurrent disinfection: Discharges from lesions and articles soiled therewith.

2. Terminal disinfection: None.

3. Prohibit the common use of towels and toilet articles.

4. Repression of prostitution.

5. Increased education in the home, school, and churches in the community.

6. Reducing the reservoir of infection by adequate case finding in the civilian community.
7. Provide adequate social, welfare, and recreational facilities.
8. Improvements of conditions adversely affecting morals and welfare of personnel.
9. Reducing promiscuity by social redirection and rehabilitation.

### ***Granuloma Inguinale***

#### ***Measures applicable to patient:***

1. Recognition by clinical manifestations: Confirmation by microscopic examination of exudate from ulcers. The presence of Donovan bodies verifies granuloma inguinale. Exclusion of other diseases by darkfield examination and serological test is necessary.
2. Isolation: Place under venereal quarantine and refuse all liberty until all ulcers heal.
3. Education: Stressing that continence is compatible with health and normal development; that prophylaxis is available and advisable if self-control fails and promiscuous sexual intercourse occurs.
4. Proper treatment with Fuadin, antimony and potassium tartrate (tartar emetic), and X-ray therapy yield good results. Streptomycin is quite effective, usually requiring about 3 months for "cure."

#### ***Measures applicable to contacts:***

1. Quarantine: None.
2. Immunization: None.
3. Report all sex contacts for past 90 days to the health department concerned, on the Venereal Disease Contact Report so that contacts may be located, and further spread of infection prevented. Among married persons, examination of the marital partner regardless of the stage of the disease in the original case.

#### ***Measures of disinfection and environment:***

1. Concurrent disinfection: Discharge from lesions and articles soiled therewith.
2. Terminal disinfection: None.
3. Prohibit the common use of towels and toilet articles.
4. Repression of prostitution.
5. Increased education in the home, school, and churches in the community.
6. Reducing the reservoir of infection by adequate case finding in the civilian community.
7. Provide adequate social, welfare and recreational facilities.
8. Improvement of conditions adversely affecting morals and welfare of personnel.
9. Reducing promiscuity by social redirection and rehabilitation.

### ***Hepatitis, Actue, Infectious***

#### ***Measures applicable to patient:***

1. Recognitions by clinical manifestations.
2. Isolation: During first week of illness.

*Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None.
3. Search for unreported or undiagnosed cases.

*Measures of disinfection and environment:*

1. Concurrent disinfection: Discharges from patient and articles soiled therewith.
2. Terminal disinfection: None.
3. Patient's blood or plasma should not be used for transfusions after a history of jaundice.
4. Proper sterilization of needles and syringes. Avoid multiple dose syringes in immunization programs.
5. Avoid use of pooled plasma dried or liquid.

**Hookworm Disease**

*Measures applicable to patient:*

1. Recognition by clinical manifestations confirmed by finding ova in the feces.
2. Isolation: None.
3. Treatment with tetrachlorethylene, hexylresorcinol or carbon tetrachloride should reduce the communicability.

*Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None.
3. Education as to dangers of spread through soil.

*Measures of disinfection and environment:*

1. Concurrent disinfections: Sanitary disposal of bowel discharges to prevent contamination of soil and water.
2. Terminal disinfection: None.

**Impetigo Contagiosa**

*Measures applicable to patient:*

1. Recognition usually by clinical manifestations.
2. Isolation: Until pustules are healed.

*Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None.
3. Instruct contacts to report any skin lesions promptly to medical officer.

*Measures of disinfection and environment:*

1. Concurrent disinfection: Sanitary disposal of dressings and moist discharges from lesions.
2. Terminal disinfection: None.
3. Check against use of common towels.

## ***Influenza***

### *Measures applicable to patient:*

1. Recognition usually by clinical symptoms (very difficult in the absence of epidemic periods).
2. Isolation: During acute stages of disease, especially in severe cases and those complicated by pneumonia.

### *Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: Not entirely satisfactory.
3. Instruction: Report promptly to physician if feeling feverish.

### *Measures of disinfection and environment:*

1. Concurrent disinfection: Discharges from nose and throat.
2. Terminal disinfection: None.
3. Increase separation of individuals and reduce crowding.
4. Improve ventilation of living and sleeping quarters.

## ***Jaundice, Epidemic (Weil's Disease)***

### *Measures applicable to patient:*

1. Recognition by clinical manifestations confirmed, if possible, by isolation of *Leptospirae* from blood or urine and positive serologic tests.
2. Isolation: None.

### *Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None.

### *Measures of disinfection and environment:*

1. Concurrent disinfection: Urine and other discharges of the patient.
2. Terminal disinfection: None.
3. Check rat control measures.
4. Protect workers in infected water with boots and gloves.

## ***Leishmaniasis: (Including: Kala-Azar, Oriental Sore and Espundia)***

### *Measures applicable to patient:*

1. Recognition by clinical manifestations with demonstration of *Leishmania donovani*, if possible. Inoculation of hamsters may be of assistance.
2. Isolation: In quarters screened against sandflies until no longer infective.

### *Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None.

### *Measures of disinfection and environment:*

1. Concurrent disinfection: Discharges from open lesions.
2. Terminal disinfection: Thorough cleaning.
3. Sandfly infested areas should be avoided as far as possible.
4. Electric fans placed at openings will aid in preventing entrance of the flies; screens must be 45 mesh to the inch to be effective.
5. Repellants may be helpful.

## ***Leprosy (Hansen's Disease)***

### ***Measures applicable to patient:***

1. Recognition by clinical symptoms confirmed, if possible, by microscopic examination.

2. Isolation: Transfer to national leprosarium as soon as possible.

### ***Measures applicable to contacts:***

1. Quarantine: None.

2. Immunization: None.

3. Search made of infected person from whom patient received infection.

### ***Measures of disinfection and environment:***

1. Concurrent disinfection: Discharges and articles soiled with discharges.

2. Terminal disinfection: Thorough cleaning of patient's quarters.

## ***Lymphogranuloma Venereum***

### ***Measures applicable to patient:***

1. Recognition by clinical manifestations. Diagnosis should be confirmed by Frei antigen intradermal test.

2. Isolation: Place under venereal quarantine, refuse all liberty, and prevent handling of all food as long as there are open lesions on the skin or mucous membranes.

3. Education: Stressing that continence is compatible with health and normal development; that prophylaxis is available and advisable if self-control fails, and promiscuous sexual intercourse occurs.

4. Proper treatment with appropriate chemotherapeutic agents such as chloromycetin, sulfathiazole, sulfadiazine or sulfanilamide may be useful in limiting communicability.

5. Adequate follow-up for evidence of inadequate treatment or concomitant syphilis.

### ***Measures applicable to contacts:***

1. Quarantine: None.

2. Immunization: None.

3. Report all sex contacts for past 10 to 30 days to the health department concerned on the Venereal Disease Contact Report so that contacts may be located, treated if necessary, and further spread of infection prevented.

### ***Measures of disinfection and environment:***

1. Concurrent disinfection: Discharges and articles soiled therewith.

2. Terminal disinfection: None.

3. Advise against common use of towels and toilet articles.

4. Repression of prostitution.

5. Increased education in the home, school and churches in the community.

6. Reducing the reservoir of infection by adequate case finding in the civilian community.

7. Provide adequate social welfare and recreational facilities.

8. Improvement of condition adversely affecting morals and welfare of personnel.

9. Reducing promiscuity by social redirection and rehabilitation.

## ***Malaria (Including Blackwater Fever)***

### *Measures applicable to patient:*

1. Recognition by clinical manifestations always confirmed, if possible, by microscopic examination of the blood.
2. Isolation: From mosquitoes only.
3. Proper treatment with appropriate chemotherapeutic agents, such as atabrine and quinine.

### *Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None.
3. Administration of prophylactic doses of atabrine, quinine, or other approved antimalarials, if indicated, for all those who have been or still are exposed to *Anopheles* mosquitoes (0.1 Gram atabrine daily or quinine sulfate, 0.6 Gram (10 grains) daily at night after dinner.)

### *Measures of disinfection and environment:*

1. Concurrent disinfection: None.
2. Terminal disinfection: None.
3. Kill mosquitoes in all living quarters. Practice mosquito-control measures in and around the station or camp.
4. Screening of sleeping quarters and living quarters (use of screening at least 18 wires to the inch).
5. No donor should be used for blood transfusion who gives a history of malaria.

## ***Measles (Rubeola)***

### *Measures applicable to patient:*

1. Recognition by clinical manifestation with special attention to rise of temperatures, Koplik spots, and catarrhal symptoms in exposed individuals.
2. Isolation: During the period of catarrhal symptoms and until the cessation of abnormal secretion (from 4 days before until 5 days after appearance of the rash).

### *Measures applicable to contacts:*

1. Quarantine: None.
2. Observation of all nonimmune contacts daily for period of 21 days.
3. Immunization: Not as a rule. In exceptional cases of nonimmunes, a single injection with 3 to 10 cc. of concentrated human Gama Globulin will usually modify or prevent measles.

### *Measures of disinfection and environment:*

1. Concurrent disinfection: All secretions of nose and throat and articles soiled therewith.
2. Terminal disinfection: Thorough cleaning.

## ***Mumps (Epidemic Parotitis)***

### *Measures applicable to patient:*

1. Recognition by clinical manifestations.
2. Isolation: For the period of swelling of salivary gland.

*Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None at present (Passive temporary immunization by convalescent serum or blood of doubtful value).
3. Observation of all exposed nonimmunes daily for period of 21 days from date of last exposures.

*Measures of disinfection and environment:*

1. Concurrent disinfection: None.
2. Terminal disinfection: None.

***Onchocerciasis***

*Measures applicable to patient:*

1. Recognition by clinical manifestations in skin or scalp and, if possible, identification of worms (*Onchocerca volvulus*) removed from tumors or microfilariae biopsied or aspirated from adjacent tissue.
2. Isolation: Patient should be made inaccessible to black gnats (*Simulium*).
3. Systematic removal of early nodules should reduce opportunity for infection of flies in endemic centers.

*Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None.

*Measures of disinfection and environment:*

1. Concurrent disinfection: None.
2. Terminal disinfection: None.
3. On shore trips have personnel—(a) Wear flyproof clothing. (b) Apply insect repellent to exposed parts several times a day. (c) Employ smoke smudges to keep black gnats away from encampment.

***Paratyphoid Fever***

*Measures applicable to patient:*

1. Recognition by clinical manifestations confirmed, if possible, by bacteriologic examination of blood, bowel discharges and urine, and by specific agglutination test.
2. Isolation: In flyproof room until repeated bacteriologic examinations of discharges show absence of the infecting organism.

*Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: Exposed susceptibles to be reinoculated with "Booster dose" of triple typhoid vaccine (0.1 cc. intracutaneously). Those not previously immunized should have the full course of immunization.

*Measures of disinfection and environment:*

1. Concurrent disinfection: Of all bowel and urinary discharges and articles soiled therewith.
2. Terminal disinfection: Thorough cleaning.
3. Check sanitation of milk, water, shellfish, or other food.
4. Check for unreported cases or carriers among food handlers.

## ***Pediculosis***

### ***Measures applicable to patient:***

1. Recognition by direct inspection for lice and nits.
2. Isolation: Until lice are destroyed and nits removed from hair.
3. Proper treatment with 10 percent DDT Powder should be useful in limiting communicability.

### ***Measures applicable to contacts:***

1. Quarantine: None.
2. Inspect heads, bodies, and clothing of contacts.

### ***Measures of disinfection and environment:***

1. Concurrent disinfection: Such washing of person and treatment of clothing and toilet articles as will destroy lice and nits.
2. Terminal disinfection: None.
3. If infestation is found general, institute disinfection procedure for entire personnel.

## ***Plague (Bubonic pneumonic)***

1. Recognition by clinical manifestations confirmed, if possible, by bacteriologic examination of blood, pus from glandular lesions or sputum; by animal inoculation.

2. Isolation: In a screened room free from vermin until complete recovery. (Masks, gowns, and gloves must be worn by those coming in contact with case.)

### ***Measures applicable to contacts:***

1. Quarantine: All contacts of pneumonic cases for 7 days; take temperature every 12 hours.
2. Immunization: Reinoculation of ship's personnel with a "booster dose" of 1 cc. plague vaccine is indicated. Those not previously immunized should have the full course of immunization.
3. Prophylactic use of sulfonamides.

### ***Measures of disinfection and environment:***

1. Concurrent disinfection: Sputum and articles soiled therewith in pneumonic type of disease.
2. Terminal disinfection: Control fleas with DDT. Destruction of rats. Bodies of persons dying of plague to be handled under strict antiseptic precautions. Thorough cleaning with continued flea and rat control.
3. Check rat guarding of ships and presence of fleas. Rat proofing of buildings and destruction of harborage.

## ***Pneumonia (Atypical, Virus, Acute Pneumonitis)***

### ***Measures applicable to patients:***

1. Recognition by clinical manifestations confirmed, if possible, by chest radiograph.
2. Isolation: Until recovery.

### ***Measures applicable to contacts:***

1. Quarantine: None.
2. Immunization: None.

*Measures of disinfection and environment:*

1. Concurrent disinfection: Discharges from nose and throat of patient.
2. Terminal disinfection: Thorough cleaning and airing.
3. Increase separation of individuals and discourage crowding.

***Pneumonia (Lobar)***

*Measures applicable to patient:*

1. Recognition by clinical manifestations. Bacteriologic tests and typing should be done, if possible.
2. Isolation: Until sputum no longer carries the infectious agents.
3. Prompt treatment with penicillin may be useful in limiting communicability.

*Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None.

*Measures of disinfection and environment:*

1. Concurrent disinfection: Discharges from nose and throat of patient.
2. Terminal disinfection: Thorough cleaning and airing.
3. Increase separation of individuals and discourage crowding.

***Poliomyelitis (Infantile Paralysis)***

1. Recognition by clinical manifestations assisted, if possible, by microscopic and chemical examinations of the spinal fluid.
2. Isolation: Until end of febrile stage.

*Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None.
3. Observation of all nonimmune close contacts daily for 14 days from last exposure.
4. No exposed food handlers must handle food for 14 days from last exposure.

*Measures of disinfection and environment:*

1. Concurrent disinfection: Nose, throat and bowel discharges and articles soiled therewith.
2. Terminal disinfection: None.

***Psittacosis (Parrot Fever)***

*Measure applicable to patient:*

1. Recognition by clinical manifestations with confirmatory tests (laboratory), if available.
2. Isolation: During febrile and acute clinical stages. (Those handling patients with cough should wear masks with 8 layers of gauze 40 to 48 threads per inch or 16 layers of gauze 20 to 24 threads per inch, changed and sterilized frequently.)
3. Penicillin should be useful in reducing communicability.

*Measure applicable to contacts:*

1. Quarantine: None for humans.
2. Observation of close contacts of patient daily for a period of 15 days following last exposure.
3. Immunization: None.

*Measures of disinfection and environment:*

1. Concurrent disinfection: All discharges.
2. Terminal disinfection: Thorough cleaning.
3. Quarantine: Quarters which housed infected birds should be quarantined until thoroughly cleaned and disinfected.
4. Incriminated birds should be killed and burned, if no laboratory is available to study the specimen.

**"Q" Fever**

*Measures applicable to patient:*

1. Recognition by clinical manifestation of atypical pneumonia on general systemic reaction. Confirm by epidemiologic study and serological tests.

2. Isolation: During febrile and acute clinical stages.

*Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None.

*Measures of disinfection and environment:*

1. Concurrent disinfection: Sputum of patient and articles possibly soiled.
2. Terminal disinfection: Thorough cleaning.
3. Search for source of infection in milk supply, check occupation in stockyards, dairies, farms, etc.

**Rabies**

*Measures applicable to patient:*

1. Recognition by clinical symptoms and history of bite by rabid animal.
2. Isolation: None if patient is under medical supervision and attendants are warned of possibility of inoculation by human virus.

*Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: Vaccine should be given promptly to patient bitten or mouthed over by animal seriously suspected of being or proved to be rabid by examination of brain of animal for Negri bodies and by inoculation tests.

*Measures of disinfection and environment:*

1. Concurrent disinfection: Saliva of patient and articles soiled therewith.
2. Terminal disinfection: None.

**Rat Bite Fever**

*Measures applicable to patient:*

1. Recognition by history of rat bite, by symptoms, and by laboratory tests, if available. Prompt cure by arsphenamines is of diagnostic value.
2. Isolation: None.

*Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None.

*Measures of disinfection and environment:*

1. Concurrent disinfection: None.
2. Terminal disinfection: None.
3. Rat eradication and prevention of rat bites.

***Relapsing Fever (Louse-Borne and Tick-Borne)***

*Measures applicable to patient:*

1. Recognition by clinical symptoms, confirmed, if possible, by laboratory means; curative action of arsphenamines also confirmatory.
2. Isolation: None.

*Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None.

*Measures of disinfection and environment:*

1. Concurrent disinfection: None.
2. Terminal disinfection: None.
3. Tick and louse eradication.

***Rocky Mountain Spotted Fever***

*Measures applicable to patient:*

1. Recognition by symptoms and history of tick bite or exposure to ticks. A positive Weil-Felix reaction during the second week of illness is a valuable confirmatory aid.

2. Isolation: None.

*Measures applicable to contacts:*

1. Quarantine: None. Not communicable from man.
2. Immunization: Active immunization by Spencer-Parker vaccine has given very encouraging results, particularly in lessening severity of the disease.

*Measures of disinfection and environment:*

1. Concurrent disinfection: All ticks on the patient should be destroyed.
2. Terminal disinfection: None.
3. Tick infested areas should be avoided as far as feasible; ticks should be promptly removed from person; hands should be protected when removing ticks from animals.

***Sandfly Fever (Pappataci Fever, Phlebotomus Fever)***

*Measures applicable to patient:*

1. Recognition by symptoms and history of exposure to bite of sandfly (genus *Phlebotomus*).
2. Isolation: Every effort should be made to prevent infection of *Phlebotomus* by preventing them from gaining access to the patient during the first day of the disease.

*Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None.

*Measures of disinfection and environment:*

1. Concurrent disinfection: None.
2. Terminal disinfection: None.
3. Sandfly infested areas should be avoided as far as possible.
4. Electric fans placed at openings will aid in preventing entrance of the flies. Screens must be 45 mesh to the inch to be effective.
5. Repellents may be helpful.

**Scabies**

*Measures applicable to patient:*

1. Recognition by clinical manifestations.
2. Isolation: Until itch mites and eggs are destroyed.
3. Prompt treatment with benzyl benzoate emulsion will reduce communicability.

*Measures applicable to contacts:*

1. Quarantine: None.
2. Search contacts for unrecognized cases.

*Measures of disinfection and environment:*

1. Concurrent disinfection: Body clothing and bedding.
2. Terminal disinfection: Underclothing and bedding to be treated by dry heat or washing to destroy the mites and eggs.

**Scarlet Fever and Septic Sore Throat (Streptococcal Tonsillitis and Pharyngitis)**

*Measures applicable to patient:*

1. Recognition by clinical symptoms; rash develops in Dick-positive individuals who are sensitive to the erythrogenic toxin. Throat cultures for hemolytic streptococcus.
2. Isolation: Until all abnormal discharges have ceased and all open lesions healed (At least 14 days from onset).
3. Penicillin treatment should reduce communicability.

*Measures applicable to contacts:*

1. Quarantine: None. (Exclusion of nonimmune food handlers from their work for period of 7 days from last day of exposure.)
2. Immunization: Usually none.
3. Prophylaxis: Sulfadiazine 1 Gram daily for all personnel under observation for 10 days.

*Measures of disinfection and environment:*

1. Concurrent disinfection: All articles that have been in contact with patient and all articles soiled by discharges of patient.
2. Terminal disinfection: Thorough cleaning.
3. Study of possible milk or food sources.

**Schistosomiasis**

*Measures applicable to patient:*

1. Recognition on clinical manifestations and if possible by microscopic examination of the stools or urine for ova.
2. Isolation: None.
3. Treatment with sodium antimony tartrate, fuadin or other trivalent antimony compounds should reduce communicability.

*Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None.

*Measures of disinfection and environment:*

1. Concurrent disinfection: Sanitary disposal of feces and urine.
2. Terminal disinfection: None.
3. Protect workers in polluted waters with boots, gloves, and other waterproof garments.

**Smallpox (Variola)**

*Measures applicable to patient:*

1. Recognition by clinical manifestations.
2. Isolation: In screened quarters, free from vermin until patient has recovered and all scabs and crusts have disappeared.

*Measures applicable to contacts:*

1. Quarantine: For those contacts vaccinated within 24 hours of first exposure, quarantine until height of reaction is passed. For those contacts not vaccinated within 24 hours of first exposure, quarantine for 16 days from last exposure.
2. Immunization: Revaccination immediately of entire personnel.
3. Meticulous search for prior case particularly checking cases previously diagnosed as chickenpox.

*Measures of disinfection and environment:*

1. Concurrent disinfection: Of all discharges. No article to leave the surroundings of the patient without boiling or equally effective disinfection.
2. Terminal disinfection: Thorough cleaning and disinfection of quarters.

**Syphilis**

*Measures applicable to patient:*

1. Recognition by clinical manifestations; confirmed by microscopic examinations of discharges and by serological tests.
2. Isolation: Place under venereal quarantine and refuse all liberty until noninfectious. (Infectiousness is not to be predicated on blood test result alone, but upon the total time, course, laboratory tests, physical inspection, and treatment summation of the case.)
3. Education: Stressing that continence is compatible with health and normal development; that prophylaxis is available and advisable if self-control fails and illicit sexual intercourse occurs.
4. Adequate follow-up for evidence of relapse or inadequate treatment.

*Measures applicable to contacts:*

1. Immunization: None.
2. Quarantine: None.
3. Report all sex contacts for past 90 days to the health department concerned, on the Venereal Disease Contact Report so that contacts may be located, treated if necessary, and further spread of infection prevented. All members of the family of a patient with congenital syphilis should be examined.

*Measures of disinfection and environment:*

1. Concurrent disinfection: All discharges and articles soiled therewith.
2. Terminal disinfection: None.
3. Advise against common use of towels and toilet articles.
4. Repression of prostitution.
5. Increased education in the home, school, and churches in the community.
6. Reducing the reservoir of infection by adequate case finding in the civilian community.
7. Provide adequate social, welfare, and recreational facilities.
8. Improvement of conditions adversely affecting morals and welfare of personnel.
9. Reducing promiscuity by social redirection and rehabilitation.

***Tetanus (Lockjaw)***

*Measures applicable to patient:*

1. Recognition by clinical manifestations confirmed if possible by bacteriologic means.
2. Isolation: None.

*Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: All wounded or tetanus-exposed persons should be given a "booster dose" of 0.5 cc. of alum-precipitated tetanus toxoid intramuscularly.

*Measures of disinfection and environment:*

1. Concurrent disinfection: None.
2. Terminal disinfection: None.

***Trachoma***

*Measures applicable to patient:*

1. Recognition by clinical manifestations.
2. Isolation: Not necessary if patient is receiving appropriate chemotherapy and is properly instructed regarding precautions against spread of secretions of the eye to others by common use of articles.

*Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None.
3. Search contacts for previously unrecognized cases.
4. For closest contacts the prophylactic use of suitable agents such as solution of zinc sulfate (1 percent), or copper sulfate (0.5 percent) may be useful as an eye wash.

*Measures of disinfection and environment:*

1. Concurrent disinfection: Of discharges and articles soiled therewith.
2. Terminal disinfection: None.
3. Check against common use of towels and toilet articles.

## ***Trench Fever***

### ***Measures applicable to patient:***

1. Recognition of clinical manifestations with history of exposure to the bite of the body louse.
2. Isolation: In vermin-free quarters until clinical recovery (recovered cases may remain infective to lice for several months).

### ***Measures applicable to contacts:***

1. Quarantine: None.
2. Immunization: None.
3. Thorough disinfection of all contacts of patient.

### ***Measures of disinfection and environment:***

1. Concurrent disinfection: Destroy all lice and louse eggs in hair, clothing, and bedding. Disinfection of urine and saliva and articles soiled therewith.
2. Terminal disinfection: None.

## ***Trichinosis***

### ***Measures applicable to patient:***

1. Recognition on clinical symptoms and marked eosinophilia aided if possible, by intradermal and precipitin tests. Confirmation by muscle biopsy after third week.
2. Isolation: None.

### ***Measures applicable to contacts:***

1. Quarantine: None.
2. Immunization: None.

### ***Measures of disinfection and environment:***

1. Concurrent disinfection: None.
2. Terminal disinfection: None.
3. Every effort should be made to trace source of infection in pork and pork products.
4. Check thorough cooking of meat.

## ***Trypanosomiasis (African Sleeping Sickness)***

### ***Measures applicable to patient:***

1. Recognition on clinical symptoms and if possible finding trypanosomes by gland or sternal puncture.
2. Isolation: Patient must be kept inaccessible to tsetse flies, particularly *Glossina palpalis* and *Glossina morsitans*.

### ***Measures applicable to contacts:***

1. Quarantine: None.
2. Immunization: None. (As an individual prophylactic, "antrypol" (Naphuride or Bayer 205) 2 Grams given intravenously should protect for 3 months or more.)

### ***Measures of disinfection and environment:***

1. Concurrent disinfection: None.
2. Terminal disinfection: None.

3. On shore trips instruct personnel to: avoid the banks of shaded streams; rid individuals, animals, and conveyances of flies by use of pyrethrum sprays after having traveled through a fly belt; and wear protective clothing and nets.

### ***Tsutsugamushi Disease (Mite Typhus, Scrub Typhus)***

#### ***Measures applicable to patient:***

1. Recognition by clinical manifestations confirmed if possible by a Weil-Felix Reaction after the tenth day, using the OX-K strain of proteus as antigen.

2. Isolation: None.

#### ***Measures applicable to contacts:***

1. Quarantine: None.

2. Observation: Susceptible personnel exposed to infected mites should be observed for 21 days for evidence of infection; the first sign may be the formation of an ulceration and eschar at the site of the mite bite.

#### ***Measures of disinfection and environment:***

1. Concurrent disinfection: Destroy all mites on the clothing or on the body of the patient.

2. Terminal disinfection: None.

3. Avoid mite-infested areas. Clear brush and grass in and around camp site. Wear mite-proof clothing. Use mite repellents. Apply rodent-control measures.

### ***Tuberculosis, Pulmonary (Including Tuberculosis, General Miliary)***

#### ***Measures applicable to patient:***

1. Recognition by physical examination and x-ray followed by tuberculin testing when indicated and confirmed by bacteriologic examination of sputum and other materials. Physical examination alone can rarely diagnose incipient cases.

2. Isolation: Proven and suspicious cases until Sputum has been negative on three successive examinations.

#### ***Measures applicable to contacts:***

1. Quarantine: None.

2. Immunization: None.

3. All contacts of an active case should be examined roentgenologically. This should be repeated after 6 months.

#### ***Measures of disinfection and environment:***

1. Concurrent disinfection: Sputum and articles soiled with it.

2. Education of patient regarding coughing and expectoration.

3. Terminal disinfection: Cleaning.

4. Special investigation of milk sources.

### ***Tuberculosis (Other than Pulmonary; including Tuberculosis, skin)***

#### ***Measures applicable to patient:***

1. Recognition by clinical symptoms and signs confirmed by bacteriologic examinations.

2. Isolation: None. (Patients with open lesions must be forbidden to handle food.)

***Measures applicable to contacts:***

1. Quarantine: None.
2. Immunization: None.
3. Special search for possible original source.

***Measures of disinfection and environment:***

1. Concurrent disinfection: Discharges and articles freshly soiled with them.
2. Terminal disinfection: Cleaning.
3. Special investigation of milk sources.

***Tularemia (Rabbit Fever)***

***Measures applicable to patient:***

1. Recognition by clinical manifestations confirmed by bacteriologic and serologic means if possible. (Skin reaction less reliable.)
2. Isolation: None.

***Measures applicable to contacts:***

1. Quarantine: None.
2. Immunization: None.

***Measures of disinfection and environment:***

1. Concurrent disinfection: Discharges from the ulcer, lymph nodes, or conjunctival sac.
2. Terminal disinfection: None.
3. Special investigation of prevalence of blood-sucking flies and ticks, of possibility of use of raw drinking water, of the dressing of wild game without gloves.

***Typhoid Fever***

***Measures applicable to patient:***

1. Recognition by clinical manifestations confirmed, if possible, by bacteriologic examination of blood, stools, and urine and by specific agglutination test.
2. Isolation: In flyproof quarters until 2 successive negative cultures of stool and urine (collect not less than 24 hours apart) are obtained.

***Measures applicable to contacts:***

1. Quarantine: None.
2. Immunization: Ship's personnel with 0.1 cc. "booster dose" of triple-typhoid vaccine intracutaneously, or 0.5 cc., subcutaneously.

***Measures of disinfection and environment:***

1. Concurrent disinfection: Disinfection of all bowel and urinary discharges and articles soiled therewith.
2. Terminal disinfection: Cleaning.
3. Investigate water, milk, shellfish, and food supply.

***Typhus, Epidemic***

***Measures applicable to patient:***

1. Recognition by clinical manifestations confirmed, if possible, by a Weil-Felix reaction in the second week.
2. Isolation: In vermin-free quarters until the temperature has become normal and an additional 36 hours has elapsed (attendants should wear louse-proof clothing).

*Measures applicable to contacts:*

1. Quarantine: In the presence of lice, exposed susceptibles should be quarantined for 14 days after last exposure.
2. Observation: In the absence of lice, exposed susceptibles should not be quarantined but observed daily for 14 days after last exposure.
3. Immunization: Reinoculation of personnel with 1 cc. typhus vaccine subcutaneously.

*Measures of disinfection and environment:*

1. Concurrent disinfection: Destroy all lice, fleas and their eggs on the clothing or on the body of the patient.
2. Terminal disinfection: None.
3. Check methods for controlling lice, fleas and rats.

**Undulant Fever (Brucellosis)**

*Measures applicable to patient:*

1. Recognition by clinical manifestations supplemented by agglutination tests and bacteriologic examinations, if possible, of the blood and urine.

2. Isolation: None.

*Measures applicable to contacts:*

1. Quarantine: None.
2. Immunization: None.

*Measures of disinfection and environment:*

1. Concurrent disinfection: Disinfection of urine and articles contaminated by urine.
2. Terminal disinfection: None.
3. Search for *Brucella* infection in goats, swine or cattle.
4. Check on pasteurization of milk.

**Whooping Cough (Pertussis)**

*Measures applicable to patient:*

1. Recognition by clinical manifestations supported by a differential leucocyte count showing a definite lymphocytosis and, in early stages, by growth of *pertussis bacillus* on special culture plates.
2. Isolation: Period of 3 weeks from onset of paroxysmal coughing.

*Measures applicable to contacts:*

1. Quarantine: None.
2. All contacts instructed to report promptly to sick bay if they have any cough or cold within 16 days after last date of contact.
3. Immunization: Not advised, except for children.

*Measures of disinfection and environment:*

1. Concurrent disinfection: Discharges from the nose and throat and articles soiled therewith.
2. Terminal disinfection: Thorough cleaning.

**Yaws (Frambesia)**

*Measures applicable to patient:*

1. Recognition by clinical manifestations supplemented by serologic tests, if possible.

2. Isolation: In flyproof quarters, as long as there are open lesions or moist discharges.

3. Treatment as for early syphilis should reduce communicability.

*Measures applicable to contacts:*

1. Quarantine: None.

2. All contacts who have open wounds should be instructed to report promptly any unusual development in or about their wound to their medical officer.

3. Immunization: None.

*Measures of disinfection and environment:*

1. Concurrent disinfection: Disinfection of all soiled dressings and linens.

2. Terminal disinfection: None.

3. Check fly control measures.

## **Yellow Fever**

*Measures applicable to patient:*

1. Recognition by clinical manifestations.

2. Isolation: For the first 4 days of fever in screened quarters free from all mosquitoes.

*Measure applicable to contacts:*

Immunization: Reinoculate personnel with 0.5 cc. of a 1-to-10 dilution of a concentrated vaccine subcutaneously.

*Measures of disinfection and environment:*

1. Concurrent disinfection: None.

2. Terminal disinfection: None. (Except to destroy any mosquitoes in the patient's quarters.)

3. Instruct personnel going ashore to: wear mosquito-proof clothing and a veil; apply insect repellents to exposed parts several times a day; and avoid as far as possible mosquito-infested areas.

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## NOTES

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## Prophylactic Immunizations

The present requirements for personnel of the Navy and Marine Corps are briefly described in the following prophylactic immunization summaries. These requirements are uniform for all personnel on active duty and are more completely described in paragraph 35B, Manual of the Medical Department.

### *Smallpox*

#### *Immunizing agent:*

Smallpox vaccine, in capillary tubes. Cowpox virus—plain, glycerinated, U. S. P. Potency period—3 months.

#### *Required for:*

All persons in the Navy and Marine Corps upon entering the service.

#### *Method of administration:*

Multiple pressure (needle held parallel to skin) 15 to 20 pricks in  $\frac{1}{8}$ -inch area, preferably on the deltoid region of arm.

#### *Expected duration of immunity:*

Three years.

#### *Required repeat vaccinations:*

*All enlisted men*—(1) Upon reenlisting; (2) Upon extending enlistment; (3) Upon being exposed to smallpox; (4) If doubt as to protection of previous vaccination arises; and (5) Annually, if serving in endemic area.

*All officers, all members of Navy Nurse Corps, WAVES, and Marine Corps Women Reserves*—(1) At intervals of 3 years; (2) Whenever exposed to smallpox; and (3) Annually, if serving in endemic area.

#### *Comments:*

Reactions are to be recorded in health record.

*Immune reaction*—Usually no vesicle. Maximum diameter of erythema reached and passed in 8 to 72 hours. Occurs in fully protected individuals.

*Accelerated reaction*—Usually a vesicle. Maximum diameter of erythema is reached in 3 to 7 days. It means there has been a partial loss of protection from previous inoculation or attack.

*Primary reaction*—Always a vesicle. Maximum diameter of erythema is reached in 8 to 14 days. Observed in unprotected individuals and those previously unsuccessfully vaccinated.

### *Typhoid and Paratyphoid*

#### *Immunizing agent:*

Typhoid vaccine combined. Triple vaccine containing in each cubic centimeter 1,000 million typhoid organisms, 250 million each of paratyphoid "A" and "B" organisms. Potency period—12 months.

*Required for:*

All persons in the Navy and Marine Corps as soon as practicable after entrance into service.

*Method of administration:*

Standard course of three injections, 1 to 4 weeks apart, subcutaneously: the first, 0.5 cc.; the second, 0.5 cc.; the third, 0.5 cc.

*Expected duration of immunity:*

Indefinite, but usually at least 1 year.

*Required repeat inoculations:*

All persons on active duty in the Navy and Marine Corps are to receive annually, after the standard course has been received, an intracutaneous injection of  $\frac{1}{10}$  (0.1) cc. triple (typhoid-paratyphoid A+B) vaccine (or 0.5 cc. subcutaneously) as a routine booster dose. Tuberculin syringe should be used for the "booster" injection.

*Comments:*

Local and systemic reactions are common, but not serious.

## ***Tetanus***

*Immunizing agent:*

Tetanus toxoid, alum precipitated, U. S. P. Potency period—24 months.

*Required for:*

All persons in the Navy and Marine Corps on active duty, as soon as practicable.

*Method of administration:*

Initial immunization, two  $\frac{1}{2}$  cc. (0.5) injections *intramuscularly* with an interval of not less than 4 nor more than 8 weeks.

*Expected duration of immunity:*

Prolonged duration—not yet accurately determined. The present program is fully protective.

*Required repeat inoculations:*

A routine booster dose of  $\frac{1}{2}$  cc. (0.5) alum-precipitated tetanus toxoid intramuscularly (1) 1 year after initial immunization; (2) every 4 years after the first booster dose (in the absence of recorded emergency booster injection); (3) when practicable, 1 month before entering a combat zone irrespective of time interval since previous injection.

An emergency booster dose: (1) Upon suffering a wound or severe burn; (2) upon undergoing secondary operations or open manipulations when contamination with tetanus bacilli or spores are likely; (3) upon incurring punctured or lacerated nonbattle wounds, powder burns or other wounds possibly contaminated with tetanus spores or bacilli.

### *Comments:*

Persons who have not received toxoid immunization and in whom passive immunization (antitoxin) may be necessary, may be started on active immunization (toxoid) by simultaneous injections in separate body areas. Tetanus toxoid may be given concurrently with typhoid and smallpox vaccines.

## ***Epidemic Typhus Fever***

### *Immunizing agent:*

Typhus fever vaccine, a suspension of killed *Rickettsia prowazeki* cultured by the Cox yolk sac method. Potency period—12 months.

### *Required for:*

All Navy and Marine Corps personnel on active duty in or about to be transferred to an area, or to the waters of an area, where epidemic typhus exists.

### *Method of administration:*

Two subcutaneous injections of 1 cc. each at intervals of 7 to 10 days.

### *Expected duration of immunity:*

Immunity is probably only relative and for not more than 6 to 8 months; peak immunity is only for 3 months.

### *Required repeat inoculations:*

A booster dose of 1 cc. subcutaneously shall be given twice each year with additional doses whenever any unusual threat of outbreak appears. Since the peak immunity can be depended upon only for a period of approximately 3 months following inoculation, it is recommended that the first of 2 routine booster doses be given 1 month before the beginning of the expected increased incidence and the second 3 months later.

### *Comments:*

No severe reactions have been reported. This vaccine does not protect against murine, endemic typhus transmitted by the rat flea, nor against "scrub typhus" (tsutsugamuchi) transmitted by mites.

## ***Diphtheria***

### *Immunizing agent:*

Diphtheria toxin, diagnostic, U. S. P. Potency period—12 months.

Diphtheria toxoid, plain, U. S. P. Potency period—21 months.

### *Required for:*

All Navy and Marine Corps personnel under 35 years of age, transferred to or contemplating travel through Europe and/or the Mediterranean region (including North African ports), unless shown to be Shick-negative or pseudoreactors.

***Method of administration:***

(1) Begin with test dose of 0.1 cc. plain toxoid subcutaneously; (2) 0.5 cc. plain toxoid subcutaneously, 48 hours later; (3) 1.0 cc. plain toxoid, subcutaneously, 3 to 4 weeks after (2); (4) 1.0 cc. plain toxoid, subcutaneously, 3 to 4 weeks after (3).

***Expected duration of immunity:***

Indefinite, but partial protection probably lasts for years.

***Required repeat inoculations:***

Not indicated in the adult.

***Comments:***

The occurrence after any dose in the series of local edema or induration more than 6 cm. in diameter, or marked constitutional reaction with fever over 101° F. is a contraindication to further doses of the toxoid, and a statement to this effect shall be entered in the health record and on the immunization chart.

***Cholera***

***Immunizing agent:***

Cholera vaccine, a suspension of 8,000 million killed cholera vibrios per cubic centimeter. Potency period—18 months.

***Required for:***

All Navy and Marine Corps personnel traveling to or on active duty in areas where there is danger of endemic or epidemic cholera. (Should, when practicable, be given 1 month prior to entering the area.)

***Method of administration:***

Two subcutaneous injections 7 to 10 days apart, the first to consist of ½ cc. (0.5), the second of 1.0 cc. of the vaccine.

***Expected duration of immunity:***

Immunity is probably only relative and for only 6 to 12 months.

***Required repeat inoculations:***

A routine booster dose of 1 cc. is to be given subcutaneously every 6 months as long as there is danger of infection by cholera.

***Comments:***

No severe reactions have been reported. Immunization should be completed before entering an endemic area.

***Yellow Fever***

***Immunizing agent:***

Yellow fever vaccine, a special strain of living virus attenuated through prolonged cultivation in tissue cultures (chick embryo). Potency period—24 months.

***Required for:***

All persons in the Navy and Marine Corps when being transferred to or traveling through areas where yellow fever is endemic

shall be given vaccine, at least 10 days prior to arrival. Defined endemic areas in Africa and South America are given in the Manual of the Medical Department, 35B 17.

*Method of administration:*

Subcutaneous injection of  $\frac{1}{2}$  cc. (0.5) of an approximately 1 to 10 dilution of the concentrated vaccine (freshly prepared).

*Expected duration of immunity:*

Four or more years.

*Required repeat inoculations:*

Routine booster of  $\frac{1}{2}$  cc. (0.5) of the diluted vaccine 4 years after the initial vaccination if in the defined endemic areas. In the presence of an epidemic an emergency booster dose of  $\frac{1}{2}$  cc. (0.5). Immunization is lifelong but in presence of an epidemic of yellow fever another dose shall be given to increase the titer of immune bodies. Repeat inoculation of  $\frac{1}{2}$  cc. of the dilute vaccine.

*Comments:*

All diluted vaccine which remains unused after 1 hour must be discarded. Yellow fever vaccine should not be given concurrently with cowpox virus, or to persons ill from virus diseases, i. e., influenza, etc. Vaccine must be kept at freezing temperature. Use only diluted vaccine. A very mild febrile reaction may occur in 4 to 7 days.

## **Plague**

*Immunizing agent:*

Plague vaccine, a suspension of 2,000 million killed plague bacilli per cubic centimeter. Potency period—12 months.

*Required for:*

All Navy and Marine Corps personnel on active duty in areas where serious danger from plague exists, and in the presence of an epidemic only.

*Method of administration:*

Two subcutaneous injections given 7 to 10 days apart; the first injection consisting of  $\frac{1}{2}$  cc., the second injection of 1 cc.

*Expected duration of immunity:*

Partial protection for 4 to 6 months.

*Required repeat inoculations:*

Additional 1 cc. doses shall be administered every 4 months (or less) so long as serious danger of plague exists.

*Comments:*

Local and systematic reactions are common but not serious and usually subside in 24 to 48 hours.

## NOTES

## NOTES

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## NURSING PROCEDURES

The hospital corpsman who develops a nursing sense and ability can become one of the most important persons in the chain of medical department personnel concerned directly with the treatment of patients. On board ships and at small stations or outposts, the technic of patient care is of major importance in getting the bed-fast man back on his feet.

Haphazard methods, unclean habits, and inattention to the mental attitude of a patient are the surest ways to retard his recovery. The hospital corpsman must organize his ward, whether for one patient or 20. The ward or sickroom must be kept neat and tidy, insofar as possible, even in a field sick bay. Every piece of equipment, when not in use, should be in its proper stowage space.

The hospital corpsman who does not practice good personal hygiene cannot stimulate his patients to be clean either. As essential as clean bed linen for the patient is the wearing of clean uniforms by the ward personnel.

The mental attitude of a patient is frequently the decisive factor determining his early recovery. Cheerfulness on the part of the hospital corpsman is generally reflected in his patients. After making certain that the ward routine is understood and followed, the patient should be catered to for his every reasonable want.

Give the patient the benefit of doubt whenever there is a question as to his aches and pains. Do *something* for him, even though you suspect his complaints are fraudulent.

## Model for Ward Routine

### *Day Duty*

- 0700—0800** Serve breakfast (up patients first). Begin cleaning details.
- 0800** Start morning care of patients—baths, treatments and medications.
- 0900** A. M. sick call—ward doctor, accompanied by the nurse and the senior hospital corpsman. Carry out “stat” orders.
- 1130—1230** Serve dinner. Ward hospital corpsmen to dinner.
- 1300—1400** Rest hour.
- 1400—1600** Visiting hours.
- 1700—1800** Serve supper. Ward hospital corpsmen to supper.
- 1800** P. M. care of strictly bed patients.
- 1900** P. M. sick call—O. O. D., accompanied by the nurse and the senior hospital corpsman. Carry out “stat” orders.
- 2000** Distribute specimen containers; start getting ward settled for the night; distribute bed pans and urinals as needed; distribute extra blankets; adjust windows for ventilation; adjust lights; and attend to last-minute needs of patients.
- 2045** Check and place head, bathroom, linen room, gear locker and diet kitchen in order.
- 2100** Night hospital corpsman relieves, after receiving special orders or reports. Smoking lamp out. Ward quiet.

### *Night Duty*

- 2045** Report on ward. Receive night report from nurse. (Understand all orders, reports, and duties.) Bed check—check with roster and liberty list.
- 2100** Send muster report to M. A. A.
- NOTE:** Make rounds frequently during the night—at least every hour. See ill patients oftener. Record in night log.
- 2200** Organize work for the night. Make a memorandum of medications and treatments to be given during night, temperatures to be taken, and specimens to be taken to laboratory. (Give all medications and treatments as ordered and record in night report and on patient’s chart. Carry out routine and all orders during night.)
- 0100** First watch to supper.
- 0130** Relief watch to supper.
- 0330** Organize work and equipment for A. M. care.

## ***Night Duty***

- 0530 Lights on. A. M. care of strictly bed patients.
- 0600 Temperatures, medications, and treatments as ordered. Collect specimens. (Check collected ones in order book and record on patient's chart. If unable to obtain, state fact in order book and record on chart.) Complete charting and night log. Chart apparent condition of ill patients, kind of night they had, and any other pertinent information. Record all T. P. Rs. Report to night nurse any elevated temperatures, and apparent condition of seriously or critically ill patients.
- 0700 Off duty when properly relieved. Take specimens to laboratory.

NOTE: Notify the night nurse of any patient's complaints, any unusual symptoms or occurrences at time of happening.

## ***Special Watch—Night Duty***

- 2050 Report to the nurse in charge and get orders.
- 2100 Take complete care of patient. Be properly relieved before going to midnight supper.
- 0600 Temperature, medications and treatment as ordered. Give complete bed bath, change linen, and clean room before going off duty.
- 0645 Complete charting. Record patient's apparent condition and kind of night he had.
- 0700 Report to day nurse in charge. Take any specimens to laboratory (having been properly checked off and recorded). Relief.

## ***Daily Cleaning***

Sweep down after meals. After first sweeping get spots off the deck, wax down, then squilgee. (Keep wax off base boards). Swab stone, unpolished wooden decks and composition decks after first sweeping, as necessary. Scrub these decks—unless contraindicated—occasionally with soap and water.

Empty waste paper baskets as necessary.

Clean and straighten bed-side lockers and tables as necessary.

Line beds, chairs, and lockers as necessary.

Clean utility rooms, head, shower room, bath room, hopper room, and gear locker every A. M. and P. M. (P. M. cleaning to be done after evening use and before day watch goes off duty.)

Clean and straighten linen room every A. M.

Polish metal work, and remove polish from grooves and woodwork every A. M.

## ***Weekly Cleaning***

### **MONDAY:**

Routine daily cleaning.

Clean electric light fixtures, vents, and signal buzzers.

Clean radiators and electric fans.

Clean wheel chairs and special equipment.

### **TUESDAY:**

Routine daily cleaning.

Wash beds, chairs, and lockers. (Remove contents and clean lockers well inside and out.)

Clean springs and mattresses; spray with insecticide.

### **WEDNESDAY:**

Routine daily cleaning.

Dust screens with a brush.

Wash windows and Venetian blinds.

Dust walls with long-handled broom to which cleaning rag is secured. Wash walls with soap and water about once a month.

### **THURSDAY—Field Day (any day before inspection):**

Routine cleaning.

Clean medicine locker, cabinets, and desk inside and out.

Wash stretchers, irrigating stands, screens, and over-bed tables.

Clean gear, gear lockers, and racks; swabs "twirled and spread out" to dry (in sun if possible); clean brooms and dust pans.

Check all cleaning details.

### **FRIDAY (Inspection):**

General cleaning.

Open locker, cabinet, and desk drawers (except those required to be locked). Have them clean and orderly. Line beds, chairs, and lockers. Open windows evenly; line Venetian blinds and shades. Secure excess gear.

**SATURDAY and SUNDAY:** Routine cleaning.

## **Cleaning and Airing Bed**

### ***When Necessary***

After discharge of patient.

Weekly.

After use by patient with communicable disease.

In case of vermin.

After death of patient.

### ***Materials Needed***

Basin of warm, soapy water.

Cleaning soap or powder.

Cleaning rags.

Brush (dust).

Newspapers.

## **Procedure**

1. Place newspapers under the bed. Strip the bed.
2. Examine the mattress for stains, vermin, and need for repair. Pay special attention to seams and tufts. If the bed is infested with vermin, remove linen without shaking it, place linen, mattress, and pillow in a bag or sheet and send it to be sterilized; or spray it thoroughly with insecticide.
3. Turn the mattress down to the foot of the bed. Dust the top with a brush. Clean the exposed springs. If the mattress is torn, repair it with needle and thread, or send it—through proper channels—to the linen room to be repaired. Remove any stains.
4. Turn the mattress to the head of the bed—dust top, clean springs.
5. Clean the side of the bed frame, then the head and foot.
6. Air the mattress over the foot of the bed, or partially doubled up—ends turned under.
7. Do not double up innersprings mattress.

## **Care of Linen**

**Keep a close check on the linen supply by:**

1. Correct daily exchange of soiled linen for clean;
2. Daily blanket count;
3. Weekly linen inventory; and
4. Keeping linen room door locked.

Exchange linen piece for piece—in the linen room or laundry. Soiled linen must be counted accurately, and listed correctly on the laundry list (make duplicate); original goes to the laundry, a copy is kept on the ward. Get an I O U for any linen owed to ward by the linen room, and obtain replacements as soon as possible.

Laundry lists are used for linen exchange and a "Charge and On Hand" book is used for the inventory. A report of the count must be made to the chief nurse, who makes a report through official channels to the commanding officer.

Insist on proper use of linen in the ward—it is not to be used for cleaning. Never use torn linen—send it separately to the linen room for exchange for good linen. Damp linen should be dried before being put in a soiled-linen hamper. Protect the linen on beds by a rubber sheet or by a rubber pillow case, when necessary, in case of hemorrhage, wet dressings, vomitus, discharge of any kind, or incontinence. Remove stains before sending linen to the laundry.

## **Removal of Stains**

**Blood:** Soak in cold water (with or without ammonia) or apply hydrogen peroxide, then wash with warm soapy water.

**Citrus fruits** Boiling water, then rinse in baking soda and hot water.

*Coffee or tea:* Boiling hot soapy water, or peroxide, or ammonia. (Lemon and salt for tea.)

*Fruit:* Clean with boiling water.

*Glue:* Soak in vinegar.

*Grease:* Naphtha, or hot soapy water, or by moistening spot then rubbing in talcum powder or starch, flour or cornmeal; allow to dry, then brush off. (In some cases, place a blotter beneath the grease spot, hot iron above.)

*Gum:* Alcohol or ether.

*Ink:* Cover spot with lemon juice and salt, or milk. Soak, then rinse in cold water, followed by warm soapy water.

*Iodine:* Cover with sodium thiosulphate, rinse, or use boiling water and soap solution, or alcohol.

*Meat and eggs:* Clean with cold water.

*Medicines:* Cold water or alcohol for tinctures; chlorine water for heavy stains.

*Mercurochrome:* Chlorine solution, 1 percent, or 5 percent acetic acid.

*Merthiolate:* Rinse in hot water.

*Metaphen:* Ammonia or alcohol. Rinse in hot water.

*Rust:* Soak in lemon juice, rinse, then scrub in warm, soapy water.

*Silver preparations:* Soak in salt water (with or without ammonia) then rinse in clear water.

**NOTE:** Soap and boiling water sets some stains. When using boiling water, stretch the article over a sink and pour water with force. Try the simplest method first.

When using acid, stretch area over basin of boiling water. Apply acid with brush, then rinse article in weak ammonia water. When bleaching by sunlight, moisten stain, then place in direct sunlight. Keep stain moist until it is gone.

## Use and Care of Equipment

### *Monel Metal*

Rinse with cold water immediately after use if the article has come in contact with organic matter.

Wash with warm, soapy water.

Use mild scouring powder for removal of stains.

Rinse well with hot water. Dry.

If automatic bedpan sterilizers are available, bedpans and urinals may be put directly in the apparatus. The cleansing is automatic. If no such apparatus is available pans and urinals must be rinsed with cold water after use, cleaned with warm soapy water, and

boiled for 10 minutes daily. Always use a cover over the pan when carrying to and from patient.

**NOTE:** Screen patient before putting him on a bedpan; do not expose him longer than necessary; do not leave him on pan any longer than necessary; do not give pan during meal hours (or visiting hours) unless necessary; protect the back of a thin patient from the pan by the use of a folded towel under his coccyx. See that the skin of his back and thighs is not sticking to the pan before removal. Heat the pan in cold weather before taking it to patient. Chart time of defecation, amount, color, consistency, and odor—if unusual.

### ***Rubber Goods***

Rubber deteriorates with sunlight, ammonia, heat, oil, cresol, or moisture. It must be thoroughly clean and dry when put away and stored in cool place.

### ***Rubber sheets and pillow cases***

Clean with warm soapy water. Rinse and dry thoroughly (use cold water first if article has come in contact with blood, pus, mucus, drainage, etc.). Powder both sides thinly with talcum; then roll on, or suspend from a rod (preferably wooden or pasteboard).

### ***Rectal tubes and catheters***

Clean inside and out with cold running water immediately after use. Wash with warm, soapy water. Rinse well. Wrap loosely in gauze, place in boiling water, and boil for 5 minutes. Dry, drain, and put away.

**NOTE:** Treat rubber tubing as above, unless for operating or dressing-room use. Never leave rubber tubing "kinked" nor clamped, when not in use. May be coiled.

### ***Hot-water bottles***

Fill one-half full if part of its weight will be on the bed or a pillow; one-third full if the entire weight will be on the patient. Expel air from bag by pressing upper part of bag against a solid surface (do not squeeze). Screw in the top, dry and place in a cover. Have the temperature of the water about 125° F.

Never use a leaking bag, nor one without a cover. To test for leaks, hold the filled bag upside down and examine—especially in and around the neck and at the seal. Never use extremely hot water. In case of an unconscious patient, place the covered bag between blankets. Watch his skin for reaction. Report any burn immediately. Place the mouth of the bottle away from the body of the patient.

**Storage:** Empty, clean, and hang up to drain. When dry, inflate with air, screw in top, and put away.

### ***Ice Caps and Collars***

Have pieces of ice about the size of a walnut. Fill the bag one-third to one-half full—one-third for whole weight on the body. Expel air from the bag by pressing it against a table with the palms of your hands. Screw in the top, dry, turn it upside down and examine it for leaks. Place it in a cover to avoid frostbite. See that the whole surface of the bag lies on the area to which it has been ordered applied. Support it with bandage ties to reduce the weight of the bag, when necessary. Keep it filled.

**Storage:** Empty, clean, and dry it thoroughly inside and out. Powder it inside with a thin layer of talcum. Inflate, screw on top, and put it away.

### ***Air Cushions***

Wash with soap and water. Disinfect, when necessary (by soaking—inflated in formalin 5 percent for 1 hour). Inflate it before putting away.

## NOTES

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## WARD CLERICAL PROCEDURES

### Admitting a Patient

Ambulatory patients should be seated in a chair near the desk.

Take T. P. R. and record on the chart. (All patients with admission temperature of 100° F. or over must be put to bed immediately upon admission.)

Fill out all headings on chart completely. Fill out admission card, in duplicate (unless patient came through admission unit), and all necessary clerical forms.

Fill out bed tag.

Fill out routine laboratory requests.

Fill out Admission Book (use large blank memo book for this, and line book with red ink in spaces for following information): Date of Admission; Name; Rate and Service Number; (or Rank and File Number); Where from; Religion; Race; Diagnosis; Nativity; Date of Birth; Name and Address of next of kin; Disposition. (Draw lines one space wide across top of every two opposing pages. Allow space "three spaces deep" for each patient.)

Enter the patient's name and any other necessary information in T. P. R. book (record admission temperature), A. M. and P. M. order book, on ward roster, ward report, and diet lists (ward and commissary).

Check the patient's valuables and personal property. Secure them according to station orders.

Report to the ward medical officer with the clinical record, on which is written patient's full name, date of admission, diagnosis, T. P. R., and whether patient was ambulatory, stretcher, or wheelchair case.

Give the patient a copy of the ward regulations to read, and have him sign that he has read them.

Assign the patient to a bed, and show him where head and bathroom are. Give him pajamas, towels, soap, and wash cloth.

Send a memorandum of his diet to the dietitian.

Send the proper notification to the Post Office.

At 0800 on the morning following admission, send to the patient personnel office (unless patient was sent to the ward by the admission unit): Original admission card; health record; service record; pay accounts; NAVMED "G" and personal effects noted on muster card (these may be sent directly to bag room). Make the muster card out in duplicate, and keep a copy on the ward.

Stretcher cases must be put to bed immediately and undressed between blankets.

Take T. P. R. and fill out the chart at the bedside. If the patient is unconscious, get the necessary information for admission from a person bringing the patient in, or from the O. O. D. Give admission bath in bed. During the bath, note any symptoms of disease or injury, or presence of pediculi (lice). Find out when the patient last voided, and if he had a defecation during the day.

Carry out routine admission procedure.

Notify the patient personnel office immediately, if the patient is placed on "Serious" or "Critical" list. Give the name of the patient, ward, time of admission, religion, and name and address of next of kin.

### ***Admitted, Other Ward (A. O. W.)***

Receive the necessary records of the patient, required to be sent by transfer ward. Assign the patient to a bed. Complete any necessary records which may have been left undone in the original ward and record any necessary information in the ward records.

### ***Transferring a Patient***

A patient cannot be transferred without a transfer slip (T. O. W.) properly made out, signed, and approved.

Notify the nurse in charge of the receiving ward that the transfer is to be made.

A hospital corpsman must accompany the patient and take the completed chart, health record, muster card, bed card and the transfer slip.

Send a copy of the T. O. W. slip to:

1. The ward receiving the patient,
2. The patient personnel office,
3. The O. O. D.,
4. The chief of the service,
5. The Post Office,
6. The rehabilitation officer.

Remove the patient's name from various word forms where it appears.

List him as "T. O. W." in the ward order book and on the ward report.

Note the change on the rehabilitation sheet.

Make proper notation in the admission book.

### ***Discharging a Patient***

The following records must be in the patient personnel office by 1000 on the day previous to discharge: Discharge slip properly made out and signed; health record; muster card; and his chart.

Have the patient (enlisted) clean his bed, chair, and locker on the day of discharge, and remake his bed with clean linen.

After the patient has gone remove his name from various records, and list him properly in the order book and on the ward report.

Make proper notation in the admission book—"Disposition" column. (Where discharged to, and date of discharge.)

**NOTE:** These procedures may vary according to the hospital.

### **Patient's Personal Property**

#### ***Money and Valuables***

Ambulatory patients may deposit money or valuables with the disbursing officer during working hours, or with the O. O. D. after working hours. A patient confined to his bed or ward may deposit valuables with the ward nurse, who will turn them over to the O. O. D. and get a receipt for them.

A person receiving valuables—other than the disbursing officer—will give the patient a temporary receipt, which receipt will be surrendered upon delivery to the patient of the disbursing officer's receipt.

In cases where the patient is not competent to assume responsibility for his valuables, the ward medical officer will be responsible for their safekeeping as noted above.

Items other than money and valuables received from patients for safekeeping will be receipted for by the ward medical officer and retained in his safe for delivery to the patient upon his discharge. Patients considered fully competent of managing their affairs must be warned that they keep valuables on their person at their own risk.

All patients, who will not turn valuables in for safekeeping, should sign a statement that they were informed of facilities for safekeeping, and that by not depositing the valuables, they assume all responsibility in case of loss.

The person making an inventory should itemize and total all money, and list each article separately. In case an officer is not available for the inventory it must be made in the presence of two responsible persons; contents then are placed in an envelope (money in a smaller one, unsealed, within a larger one). The larger envelope is identified with the patient's name, rate, service number, date, ward, and its listed contents.

The envelope is then taken, unsealed, to a person designated to receive it; the contents are checked in the presence of that person, who will place the valuables in safekeeping until they can be turned over to the O. O. D. or the disbursing officer. A receipt must be obtained.

## ***Gear and Excess Clothing***

When a patient is admitted, his gear is usually taken care of by the admitting unit. The patient receives a certification of sealing, stating that his personal effects have been sealed in his presence, as well as stating that his baggage tags are made out and attached to his gear. They bear the patient's name, rate, date of admission, ward, and duty station.

Baggage muster cards are made on each admission. These note the patient's name, service number, hospital, jacket number, date of admission, ward, and state the type and number of pieces stored. The NAVMED G and the baggage muster card are forwarded to the bag room for file. If the patient's condition does not permit him to be present at the time his gear is received, these entries are made with a person of authority bearing witness. Stubs of baggage tags are issued to the patient as a receipt, or claim.

If the patient, after admission on a ward, has excess articles he wishes to add to gear in bag room, he must make out deposit slip, in duplicate, on which is written his name, ward, date, jacket number, and list of articles for storage. If he wishes to remove articles from storage, before discharge, he must make out a corresponding "baggage removal form."

## **Principles of Charting**

### ***Order of Pages***

*Cover* (First sheet). With space for:

Name.

Rate.

Religion.

Diagnosis.

Date of Admission.

Date of Discharge.

*Clinical Chart*—NAVMED Q—For recording T. P. Rs., urine, and stools.

*Clinical Notes*—NAVMED HF-17.

*Clinical Record*—NAVMED HF-59 (Doctor's Notes) (Usually kept in doctor's office.)

*Special Examination and Treatment Reports*—NAVMED HF-57

*Laboratory Reports*—NAVMED HF-27.

Paste these reports (after the ward medical officer has seen them) each one slightly above the other on a large memo sheet, with date and kind of specimen printed at bottom of each slip to serve as an index.

*Anatomical Chart for Clinical Record*—NAVMED 59a. (Kept with the clinical record in the doctor's office.)

NOTE: Use chart rack or manila folder for the chart.

## **Chief Purposes of a Chart**

1. To serve as a record of data essential to medical service.
2. To supply the doctor with information which will enable him to judge the condition of the patient, and the effects of treatment received.
3. To aid in diagnosis.
4. To aid in teaching medical personnel.
5. As an aid in legal justice.

## **General Rules for Charting**

A good record must be accurate, complete, legible, and neat. A chart is a record giving essential information in a clear, concise manner. It is the only record the doctor has of the patient during the hours between his visits.

Fill out the heading of each page completely with the patient's full name. If there is no middle name, signify by "(n)" in the space for that name; if there is an initial, but no name, place initial in quotation marks. See that each page is numbered—one may be lost. If same date is continued on following page, print "Cont." under continuing date.

Record significant information only—items of daily care administered at regular intervals, special treatments and examinations, observations of symptoms. The doctor wants *facts*.

Use no abbreviations except those for medical terms.

Do not use chemical symbols. (Proper in some cases, but can be overdone.)

Never record a medicine or treatment until after it has been given, nor a temperature, pulse, or respiration rate until after it has been taken.

Do not write—PRINT.

Use pen and ink—blue or black ink for day charting; red ink for charting at night.

There must be no erasures on a chart. An erasure makes a chart valueless for legal purposes in case of lawsuit.

In case of error, print "ERROR" in red ink across mistake, initial, then record correction.

## NOTES

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## BED MAKING

### *Stripping the Bed*

Place all linen needed on the head of the bed or on the bedside locker, if the bed is to be remade immediately.

Place a chair at the foot of the bed for airing soiled linen and the pillow.

Loosen all bed linen, and remove pillows. (Remove cases and place pillows upright in a chair.) Patient may keep one pillow if necessary. Fold cases and place on the chair to air.

Remove the spread—fold in quarters by placing head to foot then folding across. Place it on a chair.

Remove blankets, fold in the same manner and place on a chair.

Roll sides of draw sheet toward the center of the bed, fold ends to center, then over once more. Place on a chair.

Remove the rubber draw sheet and place on the side of a chair.

Remove the bottom sheet in same manner as cotton draw sheet and place on a chair. Turn the mattress.

**NOTE:** Remove each item separately. Do not let linen touch the deck.

### *Turning a Mattress*

#### *Without Patient in the Bed:*

Fold the head of the mattress to the foot of the bed (using "fire straps" at sides for a firm grip), then straighten mattress out with top side under. Do not fold inner-spring mattresses—turn them around, then over.

#### *With Patient in the Bed:*

Loosen linen. Remove spread and pillows.

Protect the patient with the sides of the upper sheet and a blanket, folded over him; tuck the sides of the fold under his shoulders and legs. Keep him well covered.

Roll the sides of the lower linen close to the patient.

Draw the patient to the side of the mattress near you by pulling the rolled side of the lower sheet.

Go to the opposite side of the bed and pull the mattress off until half of the springs is exposed. If there is no assistant to hold the loose side, it may be supported by three chairs, previously placed alongside the bed.

Place three pillows—in cases, lengthwise—upon the exposed side of the springs and lift the patient onto them.

Turn the mattress; place fresh linen upon it—sides folded on top—and place half of the turned mattress on the exposed side of springs.

Lift the patient to the mattress; remove pillows.

Pull the mattress back on the bed, and the patient to the center. Remove the soiled lifting sheet and the draw sheet.

Make the bed.

**NOTE:** Mattress may be changed in same manner, using a side of another mattress (instead of pillows) on the exposed side of the springs. A fresh mattress, resting on the bed, should be made with fresh linen before the patient is placed upon it. (Draw the patient on the side of a fresh mattress, remove the old one, draw the fresh one into position and place the patient in the center.)

### ***Principles of Bed Making***

1. Save time and energy by working in manner that will entail going around bed as little as possible—complete one side before going to other side.

2. Have bottom and draw sheets as tight as possible.

3. Prevent bed clothes from being too tight over the patient's toes.

4. Arrange covers so that they can be turned down quickly.

5. Have all beds neat and uniform.

6. Check—and tuck under—any “rabbit ears” (Linen hanging down beneath springs).

7. Keep surroundings neat while working. Do not let linen touch the deck.

### ***Closed Bed***

A closed bed is one which is unoccupied; or it is assigned to an ambulatory patient who does not occupy it during the day.

**Mattress cover**—Turn it wrong side out. Place the closed end over the head of the mattress and work on, right side out. Fit corners neatly (may be mitered), and tie the tapes. If the mattress cover is too long, extend the sides of the cover around the foot of the mattress to the center, make envelope points out of the top and bottom, then tuck them smoothly under the mattress.

**Bottom sheet**—Put on smooth side up, sides equal, with the wide hem to the top, and the small hem even with the foot of the mattress. Tuck the excess under the head of the mattress, miter corners at the top and tuck the sheet under the sides tightly, working from the head to the foot of the bed making it taut.

**Rubber drawsheet** (if needed)—Place the center of the rubber drawsheet about where patient's hips will be. Tuck it under at the sides.

**Cotton drawsheet** (if rubber one is used)—Fold the sheet crosswise, smooth side out, and place it over the rubber sheet. Crease should be toward the head (about 12 inches from the head of mattress) and hems even toward foot (wide hem on top). This sheet must cover rubber sheets well. Should overlap 2 inches or more above and below.

**Top sheet**—Put on, rough side up, with the wide hem to the top and even with upper edge of mattress. Sides must be even. Tuck excess under the foot of the bed. Make envelope corners (miter), smooth the sheet and then tuck it under at the sides. Fold top down 12 inches.

**Blanket**—Place it on the bed evenly, with upper end about 6 inches from the top of the mattress. (This will allow enough blanket to cover the patient's shoulders when he is in bed.) Tuck it under at the foot, miter the corners and tuck under at the sides. The top part of the blanket must come under the 12-inch fold of the sheet.

**Spread**—Put the spread on right side up, sides even, stripes straight up and down, and the anchor pointing toward the lower left corner of the bed. The top should come under the pillow and over the 12-inch fold of the sheet. Tuck the lower end securely under the mattress at the foot, and miter the corners. Do not tuck the sides under unless aboard ship.

**Pillow**—Put cover and case on separately—with the creased side and corners snugly against the side and corners of the pillow. The pillow must be flat, and the pillow cover and the case smooth—the open end of cover and case together. If either the cover or the case is wider than the pillow, place the excess on the seam side. Place the pillow at the head of the bed, with the seam of the case to the back and the closed end to the entrance of the ward.

**NOTE:** Place clean linen, in the order it is needed, on the bedside locker or at the head of the bed. As each item is needed, place it (folded) on the side of the bed. Unfold (without lifting article), to the lengthwise fold. Place this fold down the center of the bed and open the linen the remainder of the way, proper side up. Complete making one side before going to the other. Blankets may be folded by placing them on a flat surface, folding the sides to the center, then double. Fold the ends of the blanket to the center together. Place them on the shelf so that the word "MEDICAL" will show on one row of blankets and "DEPARTMENT" on the other.

### ***To Change a Closed Bed Into an Open Bed***

Loosen the top linen at the sides (top sheet and blanket). Place a pillow against the head of the bed; then place the 12-inch fold of the top sheet over the top of the blanket and the spread. Fan-fold the linen toward the foot of the bed to make it ready for a patient.

### ***Fan-Folding Linen***

Facing the foot of the bed, grasp the top of the 12-inch fold (sheet, spread, and blanket) with both hands, each hand beyond the center. Lift the fold (palms of hands under) over an equal width of the bedding below. Continue folding toward the foot,

with each successive fold on the bottom. The original fold must remain on the top, and the completed folds must be the same width as the original fold. Straighten the folds, particularly at the sides, and smooth the bed.

**NOTE:** When a patient is placed in the bed, pull up the linen by grasping the top fold. Do not tuck the sides of the blanket nor the top sheet under except at a mitered corner. Secure the foot.

### ***Open Bed (Bed with Patient in it)***

Assemble the necessary linen in order, on the bed-side locker or the head of bed.

Place a chair at the foot of the bed, loosen linen, and remove pillows and spread. (The patient may retain one pillow if necessary.)

If there are two blankets, remove one in the same manner.

Place a clean sheet, rough side up (hem folded over) wide hem to the top over the remaining blanket; then replace the blanket previously removed.

If the patient is not too ill, instruct him to hold the upper edge of fold while the soiled top sheet and the remaining blanket are removed. If patient is too ill for this, tuck the clean linen under his shoulders, stand at foot of bed, and remove soiled blanket and sheet, in turn. Fold each properly and place them on a chair to air.

Fold a side of the top sheet and the blanket over the patient leaving a fold wide enough to cover back when the patient is turned on his side.

Move the patient to the far side of the bed, turn him on his side, and protect his back with a fold of the linen.

Fold or roll the draw sheets and the bottom sheet close to the patient (separately); straighten the mattress cover.

Place a clean sheet on the side of the bed, smooth side up with the center of the sheet lengthwise along the center of the bed. Fold or roll the top half of the sheet close to the soiled one.

Secure the sheet at the head and the corner at the head on the exposed side of the bed and tuck the sheet under the entire length of the bed. Draw sheets are placed on the bed in a similar manner (separately) and secured at the sides.

Move the patient to the opposite side of the bed, on clean linen and turn him on his side.

Remove the soiled linen, fold it properly, and place it on chair to air.

**NOTE:** If the patient cannot be turned or moved on the side of the bed, get an assistant to support his head, shoulders, body, hips and legs—in that order—while the soiled sheet is folded or rolled and removed—

from head to foot. A clean sheet—having been folded or rolled previously—is placed in position in the same manner and at the same time. Draw sheets may be secured at the side, rolled or folded to patient's body, and slipped under his hips as the assistant supports them, then they are secured separately and tightly under the other side of the mattress.

Straighten clean bottom sheet, and tuck it at head and side, making tight as possible. Straighten and secure draw sheets in similar manner.

**NOTE:** If the patient's top sheet is sufficiently clean it may be used as a draw sheet. If this draw sheet is not being used, remove the top sheet. If it is sufficiently clean, it may be used as the bottom sheet, thus saving linen.

Turn the patient on his back and straighten the upper bed clothing, tucking each (separately) tightly under the foot of the mattress, and mitering the corners. (Tuck the top sheet and blanket under at the foot only and at the mitered corners. When making the foot of the bed—to insure plenty of room for the patient's feet—have him hold his feet straight up while the upper linen is secured. Replace the extra blanket if necessary, the edge coming under the 12-inch fold of the top sheet.

Put on the spread, and see that the upper edge comes under the 12-inch fold of the top sheet.

Place a pillow, in a cover and a case, smoothly and correctly under patient's head and shoulders.

**NOTE:** The patient, at no time, must lie on the mattress without a cover and a sheet, or on a pillow without a case.

## NOTES

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## ***Undressing a Patient in Bed***

To prevent unnecessary exposure and exertion of a patient; to prepare him as quickly as possible for examination and treatment; and to keep him warm during the procedure, a patient may have to be undressed in bed.

### ***Uncomplicated by Injury***

Place a fan-folded blanket across the patient's chest and tuck its lower edge under his shoulders.

Grasp the upper edge of the blanket and the upper edge of the top linen, and fan fold the top linen to the foot of the bed while pulling down the fan-folded blanket.

Place a blanket under the patient, leaving him between the blankets and undress him, working under top blanket.

Remove his shoes and socks.

Remove his coat by drawing it well up to his shoulders, then over his head, removing first one arm and then the other.

Remove articles such as combs, pens and pencils, from his jumper pocket, then loosen all his clothes.

Remove as many garments at once as can be accomplished easily. Roll his jumper and shirt well up under his arms, raise his arms over head and gently slip them over first one shoulder and then the other. Slip his undershirt over his head, then pull it off over his arms. If a sleeve does not slip off readily, the undresser should put his hand in the patient's sleeve and grasp his arm above the elbow, flexing elbow, draw the arm backward, and with his (the undresser's) other hand pull the sleeve off.

Put on a pajama jacket, and fasten it at the back. (This gives protection over the patient's chest.) Pull the jacket down well.

Raise the patient's hips and slide his pants and shorts down over his buttocks.

Go to the foot of the bed, reach under the blanket, lift the patient's legs with one arm and with both hands draw his pants and shorts over his legs and feet. Put on the pajama pants. Secure the clothing.

If a doctor is to examine the patient immediately, leave him between blankets. (A hot water bottle may be necessary for extra warmth.) Otherwise pull up the top covers, and remove the blankets after the patient gets warm.

### ***In Case of Injury***

With care and gentleness remove the clothing first from the uninjured side of body, then from the injured. The injured limb must be moved as little as possible. Occasionally the patient's

clothing must be cut to remove. When this is necessary, cut along the seam on the injured side.

**NOTE:** In putting on a pajama coat, the injured arm is put in first.

### **Lifting an Injured Arm or Leg**

Never grasp a limb from above or below only, or change the position of a limb by grasping the fingers or the toes.

Never place the hands directly under the injured part. When lifting a limb, support it both above and below the site of the injury. Raise it slowly and gently.

If the entire body is to be lifted, one person must be responsible for the injured part. Lift as directed and move in unison with the body as the patient is moved.

In case of fracture—before the application of splints or cast—the hands should make a slight tension when lifting (stretching), so that the ends of the broken bone are kept from rubbing or overlapping.

## NOTES

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## NOTES

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## Bathing the Patient

### *The Admission Bath*

On admission a patient must be given a cleansing bath. It affords an opportunity to observe for any abnormalities such as abrasions, wounds, fractures, rash, skin disease, vermin, swellings, discharges, and pressure sores. The bath may be given in a shower, tub or bed, depending on the patient's condition.

**NOTE:** Stretcher and wheel chair cases, and ambulatory patients with a temperature 100° F. or over, or showing any evidence of acute illness or injury should have bed bath.

### *The Bed Bath (Sponge Bath)*

A sponge bath is given:

1. To refresh the patient;
2. To cleanse—thus preventing body odors;
3. To stimulate circulation, and provide a mild form of exercise;
4. To aid in elimination by keeping pores open (free elimination through the skin lessens strain on kidneys); and
5. To observe the patient for abnormalities, or any signs of disease or injury.

#### *Points to remember while giving a bath:*

1. Do not bathe the patient immediately after he has eaten; bathing brings blood to the skin surface and away from digestive organs. Bathe before breakfast or about 1 hour after breakfast.
2. Room should be free from drafts, and have temperature of 70° to 75° F.
3. Bath water should be as hot as can be tolerated comfortably by the hands (about 110° to 115° F.); it cools quickly.
4. The hospital corpsman should wash his own hands, and remove rings and wrist watch from patient (and self). If the patient has a ring he does not wish removed, leave it on. Also remove any articles from your jumper pocket which might fall on the patient.
5. If necessary, place a hot water bottle at the patient's feet during the procedure.
6. Avoid unnecessary exposure and chilling; this is indicative of carelessness and is poor nursing technic.
7. One bath a day is necessary for very ill patients, and at least three a week for convalescent patients (bath days for these patients are usually Monday, Wednesday, and Friday). See that up patients take their baths regularly.
8. Protect the mattress and linen by placing a towel under the part to be bathed and over the linen in that area. If possible, tuck the edge of a towel under the fold of the linen. When using two towels, place a bath towel beneath the area being washed.
9. Expose and finish one part at a time, washing and drying each separately.
10. Wash in the following order: face, neck, ears, chest, abdomen, arms, hands, back, legs, pubic region, and feet.

11. Do not let the ends of the wash cloth dangle; make a mitten of cloth.

12. Give particular attention to pressure areas, skin between the fingers and toes, umbilicus, axilla, and the pubic region.

13. Work quickly, with long, smooth, firm strokes.

14. Use a nail brush on the hands and feet, if necessary.

15. Bath includes back rub, care of the teeth, hair, and nails. Cut nails as necessary and protect the bed and deck from the clippings.

#### *Equipment Needed:*

Bath blankets.

Hand towel.

Bath towel.

Wash cloth.

Soap.

Rubbing alcohol.

Talcum powder.

Foot tub half full of hot water.

Large pitcher full of very hot water to add to water in tub as needed (do not add while patient's hands or feet are in tub).

Nail brush.

Hot water bottle (when necessary).

Comb and brush.

#### *Procedure:*

Close the windows near the patient. Screen the bed unless in a private room. Assemble the necessary equipment and clean linen for the bed and clean pajamas. Place the equipment on the locker, and the linen on the head of the bed (on a radiator in cold weather, or heat it with a hot water bottle).

Place a chair at foot of bed. Lower the bed, unless contraindicated. Remove jewelry. Loosen the linen all around. Place the lower end of the top linen over the foot of the bed. This facilitates removal of linen, cools off the foot of bed and patient's feet, and allows the patient to wiggle his toes.

Remove spread; place it on a chair. Place an extra blanket over the patient and remove the regular blanket and the top sheet. Remove pillows unless it is contraindicated. (This changes the patient's position.) Place them on a chair.

Move the patient to the far side of the bed and place a blanket on the near side, onto which the patient is then moved. Straighten the blanket on the other side to protect the bed linen. Give the complete bath from this (locker) side of bed. Place a face towel over the patient's chest and tuck the edge under the upper end of the top blanket to protect his face.

Clean the mouth and teeth. One pillow may be left under the head for this, but remove it before the bath.

Remove pajamas. Place a towel under the patient's head, pull the bath blanket down to axilla and protect with towel across chest. Tuck a side of the towel under the top of the blanket.

Bathe eyes—without soap—then with soapy wash cloth, wash face, neck, and ears. Rinse and dry.

Pull the blanket down to the waist, protect with the hand towel (tuck edge under) and wash the chest, using a bath towel to protect the linen on each side. Rinse and dry.

Expose the abdomen—pull the blanket down to pubes, cover the chest with bath towel and top of blanket with hand towel. Wash abdomen, rinse and dry.

Place bath towel lengthwise under near shoulder and arm, wash, rinse, dry, and cover. Place the bath towel diagonally across the chest—hand towel under far shoulder, and draw patient's arm toward you. Wash shoulder, arm and axilla, rinse, dry, and cover. Place a bath towel lengthwise on near the side of the bed. Put the tub on a towel near the patient; then place the patient's hands in water. Wash thoroughly, clean, and dry.

Turn the patient to the side, facing away from you. Expose his back, shoulders and hips. Arrange linen along the patient's side and around his buttocks like an "L" turned backward. Protect this linen with a hand towel, and bottom bedding with a bath towel lengthwise, one side doubled and tucked under the patient from top of his shoulder to his buttocks. Bathe his back thoroughly, washing well up into the hair line, up over his shoulders, and down well over the hips and buttocks, paying special attention to pressure areas; dry, rub with alcohol, and powder. Turn him on his back and cover well.

Fold the blanket completely away from the nearest leg. Protect linen at the groin with a hand towel, and place a bath towel under the leg from the hip to the heel. Wash the thigh and leg, rinse, dry, and cover.

Expose, wash and dry the opposite thigh and leg in a similar manner. Cover. Fold the blanket back to the knees and tuck it in around them. Protect the patient with a hand towel. Place a bath towel under his feet and legs, and move his legs to the far side of the bed.

Place the tub *lengthwise* in the bed, with the upper end supported with a folded, soiled, pillow case; lift the patient's legs (together) by placing your hand under his ankles; then put his feet in the tub, with his soles resting on the bottom. Keep pressure off

the back of his legs by a folded hand towel or pillow case. Wash his feet thoroughly, paying special attention to nails, the space between toes, and his soles. Allow his feet to soak.

Lift his feet out of the tub and place them on the end of a bath towel. Remove the tub, dry his feet, and cut his nails if necessary. (Dry feet with the free end of the towel, using a circular motion.) Cover.

Wash his pubic region thoroughly. If the patient is able, he may do this himself.

Remove the bath blankets, and make the bed with fresh linen.

Comb the patient's hair. If able, he may do this himself.

Remove the linen and equipment. Establish ventilation, and leave the bed and unit in order. Leave fresh drinking water for the patient, and his call bell within reach. Give him fresh towels and a wash cloth.

**NOTE:** For the patient to bathe himself, prepare him for the bath as when bath is given. Check on his progress and give him any assistance necessary. After the bath help him into his pajamas, make his bed and put the equipment away.

### *Tub Bath*

Bring necessary articles to the bathroom and have the temperature of the room 75° to 80° F. Fill the tub about one-third full of water at a temperature of 100° to 105° F. Place a stool or a chair and a bath mat, near the tub.

Bring in the patient, comfortably wrapped. Help him to disrobe, and assist him into the tub. He may wash his face and hands before getting into tub, if he desires.

Assist with the bath as necessary (especially wash his back). If the patient takes his own bath, watch him closely and instruct him not to lock the door to the bathroom; he is not to turn on the hot water while in the tub; nor to touch any electric fixtures while in contact with the water; to guard against slipping, a clean rubber mat should be placed in tub; tell him to call if necessary.

Assist the patient out of the tub, holding a blanket about him as he steps out onto the bath mat. See that he is thoroughly dry, clothed and in clean pajamas, bathrobe and slippers. Assist him to bed.

Put away all equipment. Empty, clean and dry the tub and leave the bathroom in order. Place a clean towel and washcloth on the patient's locker—the soiled linen in a hamper. Hang the wet linen to dry first. Leave the utility room straight.

**NOTE:** If the patient feels faint in the tub, let the water out, lower his head, and cover him with a blanket. Do not attempt (unassisted) to lift him out of tub with water in it. If the patient is able to take his own bath, his bed may be made while he is in the tub. If unable to leave

patient during the bath, the bed may be made after his bath, while he is resting in a wheel or easy chair. Do not allow him to remain in the tub longer than 10 or 15 minutes.

## **Moving and Lifting a Patient**

### ***General Rules for Lifting***

1. Use the large muscles of the back. Do not allow the shoulders to bear the weight.
2. Bend the knees slightly. Do not bend your back. Bend from the hips. Throw shoulders back. Stand with your feet apart.
3. Always draw the patient to the side of the bed before lifting or moving him.
4. After moving the patient, adjust him comfortably.

### ***To Lift Patient in Bed***

Instruct the patient to flex his knees, press his feet firmly upon the bed, make himself rigid and to remain so while being lifted.

Bending at the hips, place one arm under the patient's shoulders and the other under his thighs. When ready, tell him to push with his feet. If the patient is able to assist further, he may grasp the head of the bed and pull with his arms while pushing with his feet.

If the patient is unable to help himself, two lifters are required. One should support his head, shoulders and back by placing one arm under his back, hand extending to the opposite axilla with the patient's head resting in the crook of the arm. The second hospital corpsman should support the patient's back and legs by placing one arm under the small of the back, the other under the thighs and knees. When two or more persons lift the patient, it must be done in unison with the weight divided. Lifters may stand on the same side, or on opposite sides of the bed.

A heavy patient may be turned or moved by using a draw sheet as a lifting and turning sheet. After turning, draw the patient's shoulders forward and his hips back. Flex his knees.

### ***To Turn Patient in Bed***

*To turn toward you:* Bending at the hips, flex the patient's knees. Place one arm over the patient with your hand well under the opposite shoulder; place your other arm over the opposite hip, with your hand well under it. Lift slightly, roll him gently toward you.

*To turn from you:* Bending at the hips, flex the patient's knees slightly. Pass one hand as far as possible under the shoulders, with a firm hold in the opposite axilla, and the other well under the patient's hips. Lift him slightly, draw him toward you, and making firm pressure against the near shoulder, gradually turn his body away from you until he rests on his side. Be careful not to roll him out of bed.

### ***To Move Patient to Opposite Side of Bed***

Place one arm under the patient's shoulders with a firm hold in opposite axilla, and the other arm just below his hips. Lift him toward you. If he is very tall, lift the upper part of the body first by placing your hands under his head and shoulders, and lift him toward you. Next, place your hands under his lumbar region and knees, and move the lower part of his body toward you.

### ***To Lift Patient From Stretcher to Bed***

*Method number one:* Fan-fold the bed linen to the foot of the bed and place the head of the stretcher at a right angle to the foot of the bed.

Three lifters will stand at the side of the stretcher (on side toward bed) the strongest in the middle. First lifter places one arm under the patient's shoulders, hand in opposite axilla, with the patient's head resting in the crook of the arm. The other arm is placed under the small of the patient's back. The second lifter places one arm under the patient's hips, the other arm under his thighs. The third lifter places one arm under the patient's lower thighs, the other under his legs just above the ankles.

**NOTE:** All arms must be completely under patient, with hands up on opposite side.

Lift the patient in unison, at given signal—man at the patient's head calling signals—and in the following manner:

1. Lift the patient chest high.
2. Turn him toward you, so that he will be on his side.
3. Walk steadily to the bed.
4. Lower the patient onto bed, remove hands, pull up covers.

**CAUTION:** Keep patient well covered during procedure with blanket wrapped around feet and shoulders and tucked in at sides. Don't jar nor jolt the patient; Don't squeeze or pinch a fold of flesh; Don't drop the patient on the bed, stretcher or deck. Hold the stretcher securely.

*Method Number Two:* Place a stretcher next to the bed. Three men lift the patient as above; hold the patient while a fourth man removes the stretcher; then place the patient on the bed.

*Method Number Three:* Place a stretcher next to the bed, and have 'lifting' sheet (draw sheet) under the patient, well under his hips.

One man should stand at the patient's head, and lift his head and shoulders; one at the side of the stretcher away from the bed and lift by grasping the end of the draw sheet; the third man stands on the side of the bed away from the stretcher, lifting by the other end of the draw sheet; and a fourth lifts the patient's feet and legs. (Lift in unison, at given signals, called by the man at the head of the bed.)

### ***To Lift Patient From Bed to Stretcher***

In lifting a patient from a bed to a stretcher follow the same lifting procedure as when lifting from a stretcher to a bed.

### ***To Get Patient Out of Bed Into Wheel Chair***

Place a chair at the right side of the bed near the head. Draw a pillow over the back of a chair (chair back inside a pillow case). Also place a pillow in the seat of the chair. Open a blanket and place it in the chair cornerwise. (Make sure that the bed rollers are locked.)

Take the patient's pulse and respiration while he is lying down. Explain to him that he will experience weakness upon getting up—probably “needles and pins” sensation in feet. Tell him that if he becomes tired, or does not feel well, to report it at once. Put on his bathrobe while he is lying down, then fan-fold the top linen to the foot of the bed (linen above draw sheet).

Move the patient to the side of the bed. With one arm under his shoulders and the other under his knees, turn him around and up so that he is sitting on the side of the bed, feet over the side. Lift slowly and with care. Put on his socks and slippers.

Ease the patient onto the deck (he must not walk the first time). Turn him around and support him. Hold the chair steadily—right foot back of a wheel, and help him sit in the chair; cover him as necessary. (Raise the foot of chair and lower the back slightly, after the patient is in it, for better relaxation.) See that he is well supported with pillows (no hollows in back). See that his arms are free, his chest is protected and that he is not sitting in a draft. See that his feet and legs are snugly and neatly wrapped in a blanket and that the footrest is in place.

Move the chair to a desirable spot for a change of environment. Have a table or stand, call bell, drinking water, and reading material within reach.

**NOTE:** If the patient is unable to stand, two men are required to lift him. Raise and turn patient as above, then the hospital corpsmen—standing one on each side—should place their arms back of and under him, with the arms of the patient over their shoulders. Lift together, turn (one turn, other pivot) and place the patient in the chair. Each should hold chair steady with a foot back of a wheel.

**PRECAUTIONS:** Watch color, pulse and respiration. Watch for signs of undue weakness. Do not let the patient become exhausted. If he shows signs of undue weakness, report it at once. He must be put back to bed regardless of the time he has been up. If his condition remains good, put him to bed immediately upon expiration of time allowed up. If cyanosis or dyspnea appears, report at once to proper authority, as an embolus may have developed.

### ***To Get Patient Back to Bed***

Place the chair in the same position as when getting the patient up.

Loosen the blanket, and assist the patient to stand. (Hold the chair securely.) Assist the patient to a sitting position on the side of the bed. Remove his socks and slippers. Help him to lie down, pull up the covers and then remove his robe. Put away the blanket and pillows. Secure the chair.

## NOTES

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## Physical Discomforts and Their Remedies

### *Headache*

#### *Remedy by:*

1. Proper shading of lights, preventing eyestrain; protect the patient from a glare by placing the bed so that it does not face the light.
2. Proper ventilation and temperature; fresh air (should be free from disagreeable odors).
3. Keep temperature uniform, at about 68° to 70° F. during the day and about 60° F. at night. Bed must not be in a draft.
4. Comfortable position of patient.
5. Drinking water as desired, required or allowed.
6. Proper elimination.
7. Ice cap to head, hot water bottle to feet.
8. Medication as ordered.

### *Backache*

#### *Remedy by:*

1. Frequent change of position.
2. Comfortable position, back supported by pillows, and pillow between knees.
3. Alcohol back rubs.
4. Hot water bottle to back.

### *Thirst*

#### *Remedy by:*

1. Water (cool or hot drinks as allowed). Fluids parenterally.
2. Cracked ice; mouth wash.

### *Restlessness or Weariness*

Keep surroundings quiet, neat, uncluttered and clean. Toilet articles, medicine glasses and mess gear, should be put away when not in use. Old newspapers and magazines should be collected, flower stems cut and fresh water put in vases.

Have bed made correctly, free from wrinkles, and pillows turned frequently and arranged comfortably. Change soiled or damp linen immediately, thus guarding against perspiration and body odors by cleanliness. Have bed free from crumbs.

Have patient well up in bed, with proper support for his body, and a pillow under his knees to prevent him from slipping down. (Fowlers position, preferably, unless contraindicated.) His position should be changed frequently.

Exclude visitors during treatments, at meal times, after hypodermics or sedatives, or if the patient is not otherwise feeling well. (Be alert for signs of pain or weariness.)

Give a sponge bath, if necessary, or alcohol rub, for comfort.

Inspect all appliances frequently—splints, bandages, hot water bottles, ice caps, air cushions, wet dressings—and adjust as needed.

Check on elimination—kidney and bowel—remedy as necessary and as ordered.

Give care to the patient at the time he needs it. Perform all duties quietly and systematically without confusion.

Look for pressure sores and pediculi.

### Some Mental Discomforts

Nervousness, apprehension, homesickness, worry. Reassure the apprehensive patient. Allay fears of pain. Do not allow the patient to be teased. These patients may be helped by a kindly, pleasant, friendly, and considerate manner. See that the atmosphere of ward is cheerful, and that the patient has reading material, or some form of occupational therapy, or someone to talk to, if these are not contraindicated.

## **Cause, Prevention, and Treatment of Bed Sores**

### **(Decubitus Ulcers—Pressure Sores)**

Local ulcerating areas are usually accompanied by the death of tissue.

#### ***Symptoms***

1. Inflammation.
2. Tenderness.
3. Bluish discoloration of the skin.
4. Breaking down of tissue.
5. Ulceration.

#### ***Predisposing Factors***

Bed sores result from an interference of the circulation in the tissues, due to pressure. Anything which interferes with the circulation or nutrition of a part is likely to result in a pressure sore.

#### ***Causes***

1. Patient lying in one position too long.
2. Splints, bandages, or cast too tight or improperly applied.
3. Bed clothes too tight over toes, wrinkled under patient, crumbs in the bed, or damp or soiled linen under patient.
4. Aggravated by heat and moisture—excessive perspiration, urine, or other body discharges.
5. Uncleanliness.
6. Friction from restlessness—rubbing of the bed clothes; of two surfaces of skin together.
7. Pimples, or breaks in the skin.
8. Faulty use of a bedpan.

Special precautions must be taken in connection with lowered vitality in the emaciated patient; the paralyzed patient; the unconscious patient; the obese, or edematous patient; the diabetic; those with casts, splints, or bandages. (Inspect all appliances frequently.)

#### ***Prevention***

1. Use air or water mattress.
2. Protect bony prominences by use of rubber air rings, cotton rings covered with gauze ("Doughnuts")—size depending on area to be protected.
3. Use pillows supporting heavy parts.
4. Pad joints.
5. Separate and powder layers of flesh or contacting parts. Linen pads may be used to separate the parts. Do not use cotton.
6. Bed cradle to prevent pressure of linen.
7. Comfortable position of patient.

8. Change position frequently.
9. Avoid careless use of the bedpan.
10. Wash patient's back frequently. Give frequent massages and alcohol rubs, with special attention to pressure points.
11. Attend to pimples and abrasions promptly.

### **Treatment**

Prevention is the best treatment. If symptoms of bed sores are observed, report them at once. If the skin is broken and an abrasion exists, wash it with soap and water; dry well; rub the surrounding area with alcohol; apply a sterile dressing; and protect the area from pressure.

#### ***Mechanical Devices***

**Rubber Rings (Air Cushions):** These are to relieve pressure on the end of the spine. The patient must not lie on an uncovered ring—place the ring in pillow case. (Be sure valve is to one side when ring is under the patient.) Inflate the ring by covering the valve with several layers of gauze and blowing it about one-third full of air, or by the use of atomizer bulb. Slip the covered ring under the patient as a pillow, with the end of the spine in the center and not resting on the bed. The ring must be firm enough to support, but not so firm as to cause pressure itself.

**Cotton and Gauze ("Doughnuts"):** These are to relieve pressure on bony prominences, such as the elbows, heels, sides of knees, ankles, back of head, shoulder blades, and ears. Roll the cotton into fairly firm ring—about 8 inches round—cover smoothly with 2- or 2½-inch gauze bandage. The hole must be large enough to surround the point of pressure but not large enough to allow the part to slip through.

**Bed Cradle:** Used to prevent pressure by supporting bedclothes and to supply heat. When using an electric cradle, be careful that lights are proper distance from the skin, and not over 60 watts, unless ordered. See that lights have metal guards to prevent burning of the bed clothing. Protect the patient from the glare of lights. Secure upper bed linen neatly over the cradle.

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## POSITIONS

Positions depend upon purpose, and if for examination, also the part to be examined.

### *Dorsal (Supine, Horizontal, Recumbent)*

The patient lies on his back, legs extended or slightly flexed, with one pillow under head, arms extended or crossed. Spread a sheet or a blanket over the patient, but do not tuck it under the mattress. Fan-fold the linen toward the foot of the bed.

### *Sim's Left Lateral (Lateral Prone)*

Used for lower rectal examinations and kidney operations. The patient lies on his left side. One small pillow is placed under his head so that his left cheek rests upon it. His buttocks is brought to the edge of the bed or table, his left arm is drawn behind his back, and his body inclined forward so that he lies partly on his chest, with his upper arm flexed in front. (Place a pillow under the shoulder or chest of a heavy person to relieve respirations.) Thighs are flexed—with the upper one close to his abdomen. His knees are flexed so that the upper knee crosses the lower one and rests upon the bed or the table. Drape as for the dorsal position, but fold back a portion of the sheet to expose the part to be examined, or treated.

### *Fowler's*

A semi-sitting position, with knees flexed. (If no surgical bed or Gatch frame is available, the patient can be placed in this position by the use of an extra pillow under his knees, or by a chair tilted downward under the head of the mattress with a pillow under knees.

The purposes of this position are:

1. To assist in drainage of the chest and abdominal cavities.
2. To relax the abdominal muscles, thus easing pain.
3. Prevent strain on the muscles and sutures of the surgical case.
4. To make breathing easier in certain cases and for general comfort of patient.

### *Knee-Chest*

The patient rests on his knees and chest, his head turned to one side, with his cheek resting on a pillow. His arms are flexed at the elbows, resting on the bed partly supporting him. The thighs are perpendicular to the bed (abdomen should not rest on the thighs, but must remain unsupported). Two sheets are used, folded cross-wise, for draping patient. The fold of the upper sheet lies just

above rectum, and the fold of lower one just beneath. The sides of the lower sheet are draped over a patient's hips. This position is used for high rectal and sigmoid examinations.

### ***Trendelenburg***

This position is used frequently in the treatment of shock and hemorrhage, sometimes in the recovery from spinal anesthesia, and in many lower pelvic operations, during spinal anesthesia. The patient lies on his back, with his feet at least 12 or 16 inches higher than his head. The knees may be flexed or flat. (Flexed during operations, and if position is acute, shoulder braces are used, also.)

### ***Prone***

The face is downward—patient lies on his stomach. His head may be turned to the side, and his cheek supported.

### ***Dorsal, Recumbent***

The patient lies on his back, with his head and shoulders elevated, his buttocks brought to edge of the bed or table. His legs are separated, with his thighs and legs flexed so that soles of feet rest upon the bed or special foot support.

### ***Lithotomy***

This position is used frequently in rectal surgery, for perineal operations, and for certain genito-urinary examinations and treatments.

The patient lies on his back with his legs and thighs acutely flexed, and knees wide apart. His buttocks is brought to the extreme edge of the bed or table (perhaps a little beyond); his feet are placed in stirrups, or his knees over "knee-rests." His head and shoulders are elevated—unless during spinal or general anesthesia.

Drape one sheet over the upper part of the body and another lengthwise over the lower part. Draw the sheet up between the legs to expose the genitalia, but have the thighs, legs and lower abdomen covered. "Lithotomy" sheet may be used.

### ***Jack-Knife***

The back is bowed. The head is drawn downward toward the chest and the knees are drawn up. This position is used for a lumbar puncture (patient on his side) or for some rectal examinations and operations (patient on his stomach, his waist over a break in the table, with the table elevated and the foot lowered).

### ***Postural***

The patient lies on his stomach, with the foot of the bed or table acutely elevated ( $45^{\circ}$  to  $60^{\circ}$  angle) or head and shoulders hanging

over the side of the bed—his head being supported on a stool and resting on a pillow (a chair may be used in the bed—back up, tilted downward, padded, and with support for patient's legs.) This position favors free expectoration of pus (lung abscess and some forms of poliomyelitis.)

### *Orthopneic*

This position is for the cardiac and asthmatic patient when breathing is difficult. The patient sits upright, with his whole body supported firmly. His knees are flexed and supported to keep him from slipping down in bed. Pillows are arranged under his head, so that his head is not thrown forward. His arms should be supported with pillows or by resting them on over-bed table.

**NOTE:** The patient must be draped to avoid unnecessary exposure, but not to interfere with a thorough examination. Drape him loosely enough to allow for a quick change of position, in case of complete physical examination, and securely enough that the drapes will not be displaced as the patient moves. Drape so that only the part to be examined is exposed.

# THE PHYSICAL EXAMINATION

## *Purposes*

1. To obtain complete history of patient.
2. To make diagnosis, and to determine treatment.

## *Methods of Examination*

1. Inspection—observing with naked eye.
2. Auscultation—listening for sounds within the body.
3. Percussion—tapping an area of the body to determine condition of internal part by sounds produced.
4. Palpation—feeling with the hands.
5. Manipulation—skillful or dexterous treatment by hand.

## *Articles Needed*

1. Sphygmomanometer.
2. Percussion hammer.
3. Ophthalmoscope.
4. Tongue depressors.
5. Skin pencil.
6. Sputum cup for soiled depressors.
7. Stethoscope.
8. Flashlight.
9. Otoscope.
10. Hand towel.
11. Tape measure.

**NOTE:** Patient should be undressed and preferably lying in a horizontal position, with one pillow under head, and covered with extra sheet or blanket—top bedding fan-folded toward the foot. Have him turn his head away from the doctor during the examination, and when his chest is being examined hold a towel, folded across, between the patient's face and the doctor's. As the examination progresses expose the part to be examined, by folding a sheet away from the part, but keep the remainder of the body covered. See that the doctor has a good light, and that the temperature of the room is comfortable for the patient. Keep the patient adequately draped and in the correct position for the examination of various areas. A physical examination tray, complete at all times, should be carried by a hospital corpsman at sick call and when the doctor wishes to examine patient at other times.

## THE CARDINAL SYMPTOMS

Temperature, pulse, and respiration conform so strictly to a certain standard in health that that standard is known as the "normal temperature, pulse, and respiration." They respond so quickly to any abnormal condition in the body that any change from the normal is looked upon as a symptom of disease.

Taking the patient's "T. P. R." is one of the first means used in trying to find out the patient's condition. They are such important indications of disturbances in the vital organs and functions of the body that a close, accurate watch and record must be kept upon them. The T. P. R. record on the clinical chart indicates graphically their course and their relation to one another.

In some diseases the pulse will increase in rate as the temperature increases, or the temperature may increase without a parallel increase in the pulse rate, or the pulse and respiration rate may increase without a parallel increase in the temperature. Elevation of the temperature is not always an index of the seriousness of the disease. Usually vitality is at its lowest in early morning hours between 0200 and 0600.

### *Clinical Thermometer*

The clinical thermometer—Fahrenheit scale, and self-registering—is used in measuring body temperature. The mercury in it expands with heat. The height to which the column rises depends upon the degree of heat to which it is exposed. The scale on the thermometer runs from 94° to 108° F., with graduations in two-tenths of a degree; they are made with bulbs of different sizes and shapes, elongated bulbs for oral and axillary temperatures, and short, round ones for rectal insertion.

To shake mercury down, the thermometer is grasped securely by the upper end, with the hand flexed. A quick downward movement of the hand and wrist, as when snapping the fingers, will cause the mercury to descend. Do not shake the mercury below 95° F.

### *Fever*

Fever begins in one of two ways; sudden or gradual. It will subside in one of two ways:

1. By crisis. A sudden, abrupt drop of 4° or 5° F., within a few hours, to normal or below, as in pneumonia untreated by serum or new drug.
2. By lysis. A gradual falling to normal, as in typhoid.

### *Pulse*

An intermittent pulse is one in which beats are dropped, or skipped.

A diacrotic pulse is one with a double beat, the second part being of less force than the first.

Average normal pulse rates are between 72 and 84 beats per minute. A seriously low pulse rate is 60, a dangerously low rate is 50 or below

### **Respiration**

Respiration is the usually automatic action of breathing and consists of the alternate expansion and contraction of the chest walls which causes the lungs to expand and contract. The expansion movement, by means of which fresh air containing oxygen is taken into the lungs, is known as *inspiration* and the contraction movement, which forces the air laden with carbon dioxide out of the lungs, is known as *expiration*. Respiration consists of one inspiration and its accompanying expiration and a period of rest between them. The respiratory movements are more or less under the patient's control and therefore should be counted without his knowledge. To do this, keep the fingers upon the pulse as though still counting it, at the same time watching the rise and fall of the patient's chest, thus counting the respirations for a full minute.

The rate of respiration is the number of expirations and inspirations counted as one which occur in one minute. The number per minute in the average healthy adult is usually from 18 to 24 per minute which is considered the *normal rate*, and any considerable deviation from this rate indicates some interference with the normal functions of the body.

When the respirations of a normal, healthy adult are uniform in depth and frequency, smooth and quiet, with no sign of effort or strain, they are spoken of as *regular*. They may be temporarily increased or decreased in rate by exercise, emotion, sudden application of heat or cold, or by any sudden fear or excitement, but they quickly adjust themselves and return to normal. Respirations are termed *irregular* when they vary from the normal as a result usually of pain in the muscles or tissues associated with breathing, of disease or injury to the lungs, of undue pressure from the diaphragm caused by gas or fluid in the abdominal cavity, of weakness, shock, heat or cold, lack of air, or of an insufficient blood supply resulting from anemia or hemorrhage.

In recording the respiratory movements, notation should be made as to whether or not they are shallow or deep, regular or irregular, and whether or not the chest walls expand normally. Any difficulty in breathing, or labored breathing which usually is accompanied by rapid respiration should be noted. This condition may be caused by heart disease or by conditions of the lungs.

*Dyspnea* is difficult breathing, accompanied usually by sound. In certain diseases the sound is of diagnostic value, being characteristic of them, as a grunting sound in pneumonia, accompanied by the moist, bubbly sound of bronchitis and asthma; crowing sounds and sharp rasping breath sounds in croup; stridulent (squeaky) breathing as in diphtheria; and sighing respirations as in severe hemorrhage, and in collapse and shock, showing that the body is not receiving sufficient oxygen. (In case of hemorrhage this is often accompanied by a definite gasping for air, called air hunger.)

The type of breathing known as *Cheyne-Stokes respiration* indicates failure of the respiratory center. It is characterized by respirations which begin quietly, but at each succeeding respiration become deeper and louder until a climax is reached; then gradually decreasing until this type of respiration ceases with a deep sigh. This is followed by an appreciable pause, after which the cycle is repeated. In the second type of this class of respiration, the respiration begins and proceeds in the same manner as in the first until the climax is reached, when there is a sudden, complete pause, after which the respirations go on as before.

*Edematous breathing* is characterized by loud, moist, rattling râles, caused by air passing through fluid in the air sacs of the lungs. This fluid is the result of an abnormal infiltration of serum into the air sacs.

*Singultus*, or hiccough, consists of spasmodic inspirations suddenly arrested by an involuntary closure of the glottis. This is a serious symptom in a patient who is very ill.

REMARKS: If it causes no discomfort to the patient, allow his arm to rest lightly on lower thorax so that the rise and fall of chest wall may be felt, or watch rise and fall of bed linen, or of chest wall, without being 'obvious' as patient may not breathe naturally if he knows his respirations are being counted. Average normal respiration ranges from 14 to 18 a minute. A respiration rate as slow as 12 or as high as 30 is alarming.

### **Thermometer Unit**

The thermometer unit should consist of a tray containing:

1. Three 250 cc. beakers, or regular thermometer containers, and a rectal thermometer in special container—1 for soap solution, 1 for clear water, 1 for alcohol 70%. Containers for clean and waste cotton.
2. Thermometers.
3. Clock with a second hand.
4. "T. P. R." book and pencil.

REMARKS: If rectal temperatures are being taken, or temperatures of patients in isolation or on "precaution," there should be separate containers for these thermometers, and containers properly marked.

Beakers must be washed and filled with fresh solution every morning, and clean-cotton containers filled. (Waste cotton emptied after each period of taking temperatures). If possible, there should be a thermometer for each patient having his temperature taken.

### ***Technic of Taking the T. P. R.***

Place the thermometer well in the mouth under the patient's tongue. Tell the patient to keep his lips closed. With your fingers on his pulse count pulse and respirations, and record them. Let the thermometer remain under his tongue for 3 minutes, remove, read, record and then clean the thermometer properly.

In rooms, each T. P. R. must be completed and recorded before going to next room. In the ward, when taking more than one temperature at a time, there should be at least six thermometers—three being sterilized while three are being used.

When taking the last T. P. R. of day, check and record number of defecations and urinations patient had that day, and record them on the clinical chart. When taking T. P. R.'s in early morning watch the patients closely to prevent them from dropping or biting the thermometers.

### ***The T. P. R. Book***

Transfer T. P. R.'s from the temperature book to the clinical chart in the evening before sick call.

Use one side of the page of the small memo book for recording.

Draw straight lines in red ink across the page with a space for the name of patient, four spaces for the hours of taking the T. P. R.'s and recording them, and space for defecation report.

Write names and make recordings in blue or black ink.

Arrange names according to the side of ward—port or star-board—and quiet rooms. If only one patient of one surname is on the roster, his last name will be sufficient. If two or more patients have same last name, write the initials of each. If initials are the same also, write full name of each.

### ***The Clinical Chart***

Draw vertical lines, across the chart, over the black line, in red ink, from the top of "Day of Month" space to the bottom of the chart, dividing the record into 24-hour periods. The number of spaces in between representing the number of times a day the T. P. R.'s are taken. The usual hours are 0700, 1100, 1500, 1900. Indicate by "Adm." printed in margin, and connected to dots by black line, the patient's admission T. P. R.

#### ***How to record:***

Start the record with the admission of the patient, and fill in required information completely.

If the patient is an operative case, substitute "Day of Operation" for "Day of Disease" on date of operation, and each successive day will be that number of days after operation as—1st P. O. Day; 2nd P. O. Day; 3rd P. O. Day—and so on.

Indicate T. P. R. by black dots about the size of a pin head. Make dots in the open space of the block, not on the lines. The sections of the divided vertical lines in the temperature section correspond to divisions on scale of a clinical thermometer. The space between each two represents 0.2° F. Connect dots by a black line drawn straight between them with a ruler. When temperature is taken by any other method than by mouth indicate in red ink the method used.

Total urinations and defecations, and note enemas, or lack of defecations.

**NOTE:** Blood pressure may be recorded graphically on a clinical chart by filling in spaces with a red thin-lead pencil. Systolic pressure is indicated by the end of the column in the pulse division, the diastolic ending in respiration division.

Pulse and respiration dots can be seen through red lead marking. A separate blood-pressure chart may be kept, and as there must be spaces enough between red lines for all blood-pressure recording, a separate chart is better. Blood pressure must be recorded on clinical notes also.

### **Blood Pressure**

*Blood pressure* is the pressure exerted by the blood on the walls of the arteries in which it is flowing. It depends upon the elasticity and contraction of the arteries, the volume of blood, and the force of the heart beat. It is determined by use of the sphygmomanometer.

*Systolic pressure* is the pressure in the artery produced by the heart's contraction, and represents the total heart energy.

*Diastolic pressure* is the pressure to which the arterial tension drops during the period of rest of the heart.

*Pulse pressure* is the difference between the diastolic and systolic pressures. It represents the efficient work of the heart, opens the aortic valves, and forces the blood onward into the capillaries.

*Hypertension* is abnormally high blood pressure.

*Hypotension* is abnormally low blood pressure.

Normal blood pressure depends upon age, weight, height, and sex. In determining the normal blood pressure there are no iron clad rules. Normal systolic pressure in adults ranges from 105 to 145 mm., while normal diastolic pressure ranges from 25 to 50 mm. lower than the systolic.

Because of the serious significance of hypertension and because blood pressure is temporarily elevated by exercise and excitement, it is important that the patient should be relaxed physically and mentally before pressure measurement is taken.

The sphygmomanometer is composed of a rubber bag inclosed in a cloth cover called a "cuff." Two rubber tubes lead from the bag. To one an air pump (bulb) and a thumb valve are attached, and to the other is attached a pressure gauge.

To take the blood pressure, the arm must be approximately horizontal, and comfortably supported. Rolled up sleeves are permitted only when they do not constrict the arm nor interfere with smooth application of the cuff, which should be completely deflated before each application. The cuff is applied above the elbow, wrapped snugly about the arm, and the end fastened under a turn of the cloth. The successive turns of the cloth should be spread evenly, thus avoiding irregular bulging of the bag during inflation.

The gauge should be set, held, or clipped in an upright position with the markings clearly visible. Inflate the bag until the pulse can no longer be felt at the wrist. Place a stethoscope in position, with the diaphragm or bell held firmly over middle of space on the anterior surface of the elbow, over the brachial artery. Release pressure gradually by slightly opening the thumb valve.

Movement of the hand on the gauge will be noticed before sounds can be heard through the stethoscope. This is due to the beating of the blood against top edge of cuff, and is to be disregarded. As soon as the pressure is relieved sufficiently to permit blood to enter the arteries below the cuff—as thumb valve is slowly opened—a "blowing" sound—occurring at the same time as perceptible pulse beat at the wrist is heard.

The high indication of the hand on the gauge at the instant the first regular, or thumping sound is heard, indicates the systolic pressure. This first regular sound should be noted. Continue to release pressure in the bag slowly, a few millimeters at the time, with the stethoscope still in place so that the extent of the movements and the character of the sounds may be noted accurately. The sounds will gradually grow fainter, and will finally disappear. A reading should be made at the point where the last clear sound is heard, as that is the diastolic pressure. Record systolic pressure first, then diastolic. B. P. 140/80, for example.

## A. M. and P. M. Care

### *Early Morning Toilet*

1. To refresh and cleanse after the night.
2. To make the patient comfortable and ready for breakfast and sick call.

Pass bed pans and urinals. Remove them when used. Place on a locker within the patient's reach: A glass of water, tooth brush, emesis basin, mouth wash or tooth paste, hand basin with hot water, soap, towel and comb.

Place a hand towel partly over the pillow and partly on the bed, and an emesis basin under patient's chin. Brush patient's teeth. Wet, and clean the brush by pouring water over it. If patient has sordes (a foul-smelling scum on teeth and lips) the teeth may be cleaned by a tongue depressor covered with gauze, or cotton applicators if his mouth is very sore. A plain tongue depressor may be used to keep the side of his mouth away from the brush. Massage his gums. Let him use a drinking tube for the mouth wash if he is very ill.

Wash his face and hands. Comb his hair. Straighten his bed clothes, tighten the draw sheet, shake the pillow, straighten the locker, or bedside table.

Place the patient in a comfortable position to eat his breakfast. Remove all articles used in A. M. care, clean, and put them away properly before going off duty.

NOTE: If the patient is able, allow him to wash his own face and hands, brush his teeth and comb his hair. If he wishes to shave, bring the necessary articles to his bedside. Shave the patient unable to shave himself.

### *Evening Toilet*

1. To refresh the patient after the day.
2. To make him comfortable for the night.
3. To induce sleep.

The evening toilet is given to all bed patients before 2100. It should follow the evening sick call, unless it is necessary to begin earlier, and consists of morning care procedure, plus:

1. Alcohol back rub. (If time allows, wash his back with soap and water first.
2. Place fresh drinking water on his locker.
3. Give him extra covering when necessary.
4. Arrange extra ventilation.
5. Adjust lights.

NOTE: If patient is on liquid diet, or "forced fluids," give him nourishment or water during night, at regular intervals, when awake. Do not waken patient for nourishment or medication unless ordered to do so.

## *Oral Hygiene*

### *(Care of the Mouth)*

Assemble necessary articles for mouth care. Clean the teeth and roof of his mouth with a tooth brush, cotton applicators, or gauze over tongue depressor. Massage gums. Do not injure mucous membrane. Give him a mouth wash. Moisten his lips and tongue with mineral oil, or equal parts of glycerine and lemon juice.

Conditions requiring frequent oral hygiene (about every 2 hours) :

1. Seriously ill patients.
2. Patients with high temperature.
3. Unconscious patients.
4. Dying patients.
5. Patients with mouth surgery or injuries.
6. Patients with inflamed or diseased mouths.

Oral hygiene should be given every morning and evening, and after feedings. Keep the lips and tongue in good condition by frequent applications of mineral oil (use cotton applicator), as these patients often suffer with dry and cracked lips and tongue, and with irritation of the gums and mucous membrane of the mouth. This is due to rapid evaporation of the secretions of the mouth due to fever, etc. Unless the mouth is kept clean, sores and other infection will develop. The eustachian tubes and sinuses may become involved. Oral care should be continued during night when patient is awake.

### *Diseased Conditions of the Mouth*

*Sordes*: A dark brown layer (accumulation) of food residue, dried epithelial tissue, mucus, and bacteria, on the lips, teeth, and gums. It adheres to the teeth and mucous membrane necessitating removal by an applicator or by the use of gauze around tongue depressor. It is caused by improper care of the mouth.

*Stomatitis*: Inflammation of the mouth.

*Ulcerative stomatitis*: Usually seen in debilitated persons who have had poor food and poor hygienic conditions.

*Parasitic (thrush) stomatitis*: Occurs chiefly in infants improperly fed and cared for. Characterized by small milk-white elevations upon the mucous membrane. (If forcibly removed, it leaves a raw surface.)

*Mercurial stomatitis*: Sometimes follows the administration of mercury. Early symptoms are metallic taste, increase in saliva, and soreness of mouth when teeth are brought together. Later symptoms are salivation, redness, tenderness of gums, fetid breath,

enlargement of sub-maxillary glands, difficulty in opening mouth, and in severe cases ulceration of mucous membrane, loss of teeth and necrosis of jaw.

*Gangrenous stomatitis:* Occurs occasionally in some fever diseases when vitality is greatly reduced.

*Vincent's Angina* (Ulcerative stomatitis, mildly contagious): Red, spongy, swollen gums, mouth ulcers with offensive bloody discharge, formation of grayish or yellow false membrane on throat, difficulty in swallowing, fetid breath, and usually a high temperature.

## Collection of Specimens

### *The "Nine" Rights*

1. The right specimen, from
2. The right patient, collected in
3. The right manner, at
4. The right time, into
5. The right container, in
6. The right amount, and with
7. The right label, and taken to
8. The right place in the laboratory, and given to
9. The right person.

### *Urine*

*The "routine" specimen:* Urine passed at one voiding and sent to laboratory for routine examination.

This specimen is usually the first one voided in morning. (The urine will have accumulated over night and will be unaffected by food or medicine.) Routine specimens may be sent to the laboratory at any time in an emergency. Send a routine specimen for all new patients to the laboratory the morning after admission.

Send a routine "Pre-Operative" specimen to the laboratory the morning prior to surgery, and routine "Post-Operative" specimen to laboratory the morning following surgery.

*The catheterized specimen:* Ordered when the doctor wishes urine uncontaminated by bacteria outside urinary tract.

This urine is collected under aseptic conditions into a sterile container and should be taken immediately—without contamination—to the laboratory. Mark the specimen as "Catheterized."

*The sterile specimen not catheterized:* May be obtained by making the public area surgically clean with soap and water, with the parts bathed with a 3 percent solution of boric acid, or painted with an antiseptic, and having the patient void into a sterile container.

*The 24-hour specimen:* Have a clean, wide-mouthed, one gallon jar, labeled correctly with a laboratory slip. Have patient void

5 minutes before the hour of starting specimen—usually 0700—. *Discard that voiding.* Save all urine voided from that time up to, and including that voided at same time on following morning (have patient void at that time).

Keep the jar tightly closed as urine decomposes. Keep the specimen in cool place, and see that a preservative is in the jar. Measure and record each voiding, and record the total amount on the chart. (See that the patient and all hospital corpsmen know that a specimen is being collected. Take the jar containing all urine voided during the 24 hours to the laboratory promptly when collection is finished.

**NOTE:** The doctor may order a special amount taken to the laboratory from the measured, well mixed total specimen.

### *Feces*

The specimen should not be mixed with urine. Do not place too much in the container. Keep the outside of container clean. Take the specimen to laboratory as soon as possible. If an enema has to be given to obtain the specimen, the solution used should be normal saline or tap water.

The first stool in the morning should be sent to the laboratory when an examination is to be made for ova. Sometimes the whole stool is necessary for this. When the specimen is to be examined for *amoeba*, it should be kept at body temperature until examined.

When the specimen is to be examined for bacteria, great care must be taken to prevent contamination. Use a sputum cup, or small glass jar for specimen. Containers must be well covered.

Transfer the specimen from bed pan to container by use of tongue depressors. Specimens must be sent to laboratory fresh.

### *Sputum*

Obtain a single specimen in early morning before food is taken. Collect it in a sputum cup unless a sterile specimen is ordered. Use no disinfectants, or antiseptic mouth washes. Have the patient rinse his mouth with clear water to remove any debris, then to expectorate excess saliva. Instruct him to cough deeply in order to obtain a specimen from bronchi or lungs, and to expectorate directly into container.

If a 24-hour specimen is ordered, place a sputum cup, labeled properly, on the patient's locker at specified time—0700. Explain to him what the cup is for, and that it must contain only what he coughs up from his lungs—no excess saliva, no cigarette ashes or butts, nor matches, etc. Collect the specimen the following morning at 0700 and take it to the laboratory as directed.

When a sterile specimen is required, use a sterile Petri dish with a cover, or a sterile wide mouthed bottle with a sterile paper cover. Take special precautions to prevent outside contamination. Have the patient cough directly into container.

Have a specimen slip, properly made out, secured to container with rubber band, when the container is placed on the patient's locker at the beginning of unsterile specimen collection; have printing folded inside.

### ***Smear***

Have a sterile, cotton-stoppered, glass test tube containing two cotton applicators and two sterile, glass slides, covered with sterile gauze or paper. Remove one applicator from the tube and saturate it with secretions from area of discharge. (Replace cotton stopper without contamination after first applicator is removed.)

Rub the applicator across one slide until middle part is covered, then, after material is dry, cover with other glass slide and wrap slides in gauze or paper.

### ***Culture***

Remove the remaining applicator from the tube, and saturate it with material to be examined. Replace the applicator in the tube, and replace uncontaminated stopper. Place a folded laboratory slip, properly made out, around the test tube and glass slides, secure it with rubber band, and take it to the laboratory immediately.

## **Symptoms**

Symptoms are signs or indications of conditions existing, imminent, or likely to follow.

*Subjective:* Those complained of by the patient. Perceived by him only. (Sore throat, headache, nausea, pain, etc.)

*Objective:* Those apparent to the observer. (Perceived by others.) Discovered by sight, hearing, touch, smelling, etc. (Inflammation, swelling, vomiting, discoloration, etc.)

### **Some Symptoms (Other Than Normal) To Observe and Record**

*Face:* Swelling; inflammation; cyanosis; flushing; other discoloration; paleness; rash; pimples; infection.

*Expression:* Relaxed; pinched or drawn; anxious; worried; apprehensive.

*Eyes:* Bright; dull; fixed; staring; bulging; bloodshot; with expression of pain; pupils dilated (evenly or unevenly); contracted; pin-point.

*Nose:* Difficulty in breathing; whether septum appears deviated; any discharge, and the nature of it.

**Ears:** Pain in ear; tenderness behind ear; drainage; deafness; cerumen (wax).

**Gums:** Pale; spongy; bleeding; receding; any unusual marking (grayish or greenish blue line along margin).

**Breath:** Difficult; hot; feverish; metallic; "fruity"; odor of acetone; sweet; sour; foul; fetid; urinous.

**Abdomen:** Soft; relaxed; rigid; tender to touch or pressure; enlarged by tumor; distended (may be distended from gas, or abnormal collection of fluid, accumulation of urine or feces. Note free expulsion of gas by rectum, or undue belching).

**Skin:** Pale; flushed; cyanotic; yellow; other discolorations; dry; hot; cold; clammy; bruised; eruptions; sores; flabby; moist.

**Body:** Well nourished; thin; emaciated; swollen; edematous; distended; insect bites; rash; relaxed; legs flexed or stretched out; rigid, with one or both legs drawn up to ease abdominal pain; rigid with pain; afraid to move; whether patient lies on side to ease pain; head thrown back; back bowed.

**Swelling:** Hard; tense; soft; fluctuating.

**Muscles:** Relaxed; rigid; tense; twitching; contracted; flabby; atrophied.

**Joints:** Inflamed; deformed; painful.

**Pain:** Location; duration; time; before or after eating; accompanied by nausea, or abdominal distention; extent of area involved; steady; intermittent; stationary; radiating; colicky; severe; dull; irritating; nagging; sharp; shooting; spasmodic; superficial; deep; burning; stinging; relieved or aggravated by pressure.

**Mental condition:** Calm; alert; restless; nervous; emotional; hysterical; excitable; depressed; irritable; clouded; confused; dull; irrational; drowsy; semiconscious; comatose.

**Nausea:** Times; severity; duration; cause, if known.

**Vomiting:** Whether before or after meals, drink, or medicine; presence of mucus, pus, or feces; whether with or without pain; whether with fully digested food, partly digested food, undigested food, or little or no food; clear or watery; green with bile; blood streaked, bright red, or dark red ("coffee grounds"); whether acid or bitter; with odor of urine or feces; projectile, or without force; difficult, or involuntary; amount.

**Cough:** Continuous; severe; loose; dry; hacking; hard; deep; chronic; occasional with or without expectoration; painful; persistent; slight.

**Sputum:** Amount; odor; rusty ("prune juice"); blood streaked; frothy red blood, coming with gush (pulmonary hemorrhage); heavy (sinks in water); purulent; mucopurulent; greenish gray (advanced stage pulmonary tuberculosis); thick; fluid, light or dark; raised easily or with difficulty; raised with or without pain.

**Urine:** Amount in 24 hours; color; blood tinged; dark from concentration; colored by food or bile; cloudy from pus or mucus; pale; colorless; large amount; small amount; sediment; shreds of mucus (decomposed urine has odor of ammonia).

**Feces:** Number of stools in 24 hours; color; amount; hard; loose; soft; watery (consistency); any alteration in size or shape from normal; appearance of blood (black or tarry); light blood from fresh bleeding (if mixed with stool bleeding is some distance from rectum, high in intestinal tract or stomach; if blood coats stool, it is probably coming from hemorrhoids, or fistula fissure, or other anal or rectal condition); note the presence of undigested food, mucus (inflammation or irritation of mucous membrane); pus (pus in feces is a grave sign; it indicates suppuration of intestines, liver, or pancreas, or rupture of abscess into intestinal tract); whether stools are gray or grayish (indicates trouble with liver, or morphine addiction); note whether stools are colorless, or clay colored (indicates jaundice); presence of parasites; whether flatus was passed with stool.

**Discharge:** Character; appearance; odor; amount.

### **Nursing Care of a Delirious Patient**

*Delirium* is a mental state characterized by a rapid flight of ideas that are incoherent and often unintelligible.

Some of the causes are: an infectious disease; intoxication; drug poisoning; organic cerebral disease; head injuries; profound inanition (exhaustion from starvation); hyperacute mania; sudden trauma; high fever; following childbirth (puerperal mania).

**Characteristics.** Delirium may be: Sudden; gradual; violent; noisy; mild; wild; maniacal.

### **Treatment**

1. Find the cause of the delirium and institute treatment of the causative condition.
2. Check up on the action of the kidneys and bowels. Promote elimination by forcing fluids, and laxatives or enemas as needed and ordered.
3. Sedative drugs as needed and ordered. Keep the patient quiet. Restrain him only when necessary and ordered. Have restraint at hand.
4. Never leave a delirious patient alone—watch him closely even when the symptoms appear mild.
5. Never leave any article which may be used to cause an injury near or in reach of a delirious patient.
6. Never allow a delirious patient to be teased. Keep other patients away from him.
7. Watch temperature and pulse closely.
8. Report any serious change in his condition at once. Never give medicine in pill or powder form—dissolve.

One of most difficult nursing problems is encountered in the incontinent patient. The bed should be protected under his hips by draw sheets and cotton pads with a moisture-proof base (wax paper), or a small rubber sheet over the draw sheets covered with a quilted or cotton pad, or by putting an absorbent diaper on the patient and covering it with a rubber protector.

Inspect draw sheets and padding frequently and make any necessary changes. Urinal may be secured in place (or a retention catheter—upon order of the doctor.)

Special care must be taken of the skin to prevent bed sores. Daily cleansing baths, and frequent bathing of buttocks and genitalia are necessary.

### ***Limitation of Movement***

Do not use restraints unless absolutely necessary, and then only when ordered. Enforced restraint is very distasteful to a conscious person, and nearly always meets with mental if not physical resistance.

*General precautions in using restraints:* If possible, avoid restraint over the patient's chest. Watch his pulse. If he is struggling, or is delirious, extra work thrown on the heart may cause death, as restraints tend to aggravate him and increase his mental excitement.

When restraining arms and legs, do not have the restraint too tight—watch circulation. Never restrain only one side of the body. If it is unnecessary to restrain both hands or both feet, restrain hand and foot on opposite sides.

Remove restraints every 2 hours for an alcohol rub, or bathing of limbs. Appliances which are likely to become soiled by body excretions must be protected with moisture proof material.

## **Care of the Dying and the Dead**

### ***The Dying***

1. Look for signs of failing circulation (be alert to changes).
2. The feet, and later the hands, nose, and ears are cold to the touch.
3. There usually is excessive sweating.
4. The skin is pale, or mottled from congestion of blood in the veins.
5. The jaw sags, as a dying person breathes through his mouth.
6. Reflexes gradually disappear, pupils fail to react to light, and there is inability to swallow.
7. Frequently there are edematous respirations.
8. Eyes are sunken and the lids are half closed.
9. Speech is made with effort.
10. Signs of anxiety or distress. The patient may be restless or talk incoherently.

### *Nursing Care and Treatment:*

#### 1. Special care of the mouth.

2. Mineral oil or equal parts of mineral oil and lemon juice or glycerine may be applied to the lips and tongue. Water or other liquid may be given in spoonful amounts on the back of the patient's tongue, at side of his mouth, to satisfy thirst and to moisten tongue. When mucus collects in his mouth, remove it with a gauze sponge held with forceps, or by a gauze drain in the side of his mouth. (Turn the patient on his side, if possible, as that position is comfortable and the mouth drains better.)

3. Support the patient's body well with pillows, and turn his face toward the light. Do not darken the room. Speak to him distinctly and stay near him. Do not whisper in his room, or say anything which he should not hear, as his hearing may be acute. Be tactful. Do not let him know his condition.

4. Give all medications and treatments as ordered, quickly, and record them on a memo pad at the bedside (to be recorded on chart later) time given and effect on the patient.

5. See that a chaplain visits the living patient. See that the next of kin has been notified.

6. Direct the treatment toward saving life, and relieving the patient's discomfort. In relief of discomfort, change wet or dirty linen and pajamas, rub skin with alcohol, straighten pillows. Prevent unpleasant odors by strict cleanliness. Give extra covering if desired, or remove extra covering if he is too warm.

7. Put a bedpan and urinal in place periodically, as the patient may use them even though he is unable to ask for them. If he becomes incontinent, give nursing care as directed for incontinence. Report any distention of bladder.

8. If the patient makes any dying statement, make every effort to understand it—it may be very important. If he makes a legal statement, write the declaration in his own words, and if possible have him sign the statement in the presence of witnesses.

9. The patient should have confidence in his corpsman. Corpsman comes closely into contact with intimate life of patient, so must not discuss any happening with anyone except proper authorities. Do not make public facts which should be professional secrets.

10. Notify the person in charge of the ward when death is near, and see that the doctor is notified.

11. When the patient expires, note the exact time respirations cease. Make no effort to prepare the body until a doctor has pronounced him dead. A patient is not legally dead until a doctor has certified his death.

**NOTE:** A gravely ill patient is placed on the "Serious" or "Critical" list by the ward medical officer. This list, with space for the name of patient, his rate, ward, religion, date, diagnosis, name and address of next of kin, and for statement whether or not next of kin has been notified (the latter filled in by the record office), is made out by the ward nurse, signed by ward medical officer and then taken to the record office where copies will be made by which necessary departments will be notified and a notification letter is sent to next of kin. Have a patient listed on serious or critical list on the ward report every day he remains on that list. Notify the record office of any change. (May be the routine of the hospital to make the notification through the personnel office.)

## ***The Dead***

In the presence of the dead, the hospital corpsman should be quiet, calm, orderly and respectful, and make others be the same. He should be thoughtful and considerate of relatives or friends, and of other patients. Do not discuss death with those who do not need to know. Let the body show evidence of careful and respectful handling.

*Preparation of body:* After the doctor has pronounced the patient dead, if relatives are present, leave them alone with the deceased for a few minutes. Do not give away any of the patient's belongings, and see that nothing belonging to him is taken at this time.

Close his eyes immediately. Replace any dentures which may have been removed, close his mouth, and place a folded towel under his chin to support the jaw. (Small, wet pledgets of cotton on lids may keep eyes closed, or small piece of wet cotton may be inserted under each upper lid, if necessary.)

Straighten the body (lower the bed if the patient is in a Fowler's position), place his arms at his sides, and elevate his head on one pillow. Prepare the body as soon as possible because of "rigor mortis," and to prevent discharges from body cavities.

Make the body as presentable as possible—undisturbed, clean and free from discolorations. Endeavor to keep a natural appearance of the patient. (Body must be bathed, wrapped in clean sheet, and plainly marked—to avoid a mistake in identity.)

Remove any hot water bottles, ice cap, air cushion, cotton rings, splints, or casts. Remove upper bed clothes and pajamas. Remove any soiled dressings, adhesive, or drains. If it is drainage case, pull the sides of the wound together with adhesive.

Pack his rectum with cotton, using tongue depressor. Urethral meatus may be packed with cotton. If bladder is distended, catheterize the patient.

Wash his face, neck and ears, and comb his hair. Secure the jaw—with a bandage, if necessary.

Give a bath, and when complete, place fresh dressings over any wounds and secure them with adhesive; place an abdominal pad over the pubic region and rectum, securing with a T-binder, if necessary.

Cross his arms over his chest. Wrap cotton around the wrists and secure them together loosely with gauze bandage. Wrap cotton around his ankles and secure them together loosely with a 3-inch bandage.

Fill out two Manila tags with the full name of the patient, his rate, service number, diagnosis, religion, date and exact time of death, and ward. (Diagnosis is especially important if the patient

died of contagious disease. In this case, write "CONTAGIOUS" in large letters on the tags.)

Tie one tag to right great toe.

Place clean sheet diagonally under the body. (If death was due to an infectious disease wet this sheet with 5 percent phenol solution, or official embalming fluid before placing it under the body.)

Draw the upper corner of the sheet over his head, and the lower corner up over his feet, then fold sides across body. The body must be completely covered. Secure a sheet with a safety pin at the neck, chest and feet.

Attach the second tag with a safety pin to the sheet at the foot.

Notify the morgue. The transfer of the body should be done quietly, and with respect and dignity.

Remove all used equipment, dirty linen, and waste.

After the body has been removed, clean and air the mattress and room properly. Let the mattress air in the sunlight, if possible, for about 6 hours before making the bed.

### ***Patient's Personal Property and Valuables***

All personal effects, including money, papers, keepsakes, religious emblems, jewelry, clothes, etc., must be collected and inventoried. Money must be itemized and totaled. If jewelry, such as a ring, cannot be removed, make a note of it on the itemized list. Nothing is too small to be listed. Association may make it of value to the family.

If deceased was an officer, this inventory shall be completed by two officers; if enlisted, it shall be done by an officer in charge, or one detailed for that purpose.

Collect property and valuables, and make an itemized list—in triplicate—of everything belonging to the patient. The list to be attested to and signed by the persons making the inventory.

Upon completion of the inventory, the effects shall be put in packages of convenient size—jewelry and other valuables in separate containers within the package—turned over to the proper authority, the property checked in his presence, packages sealed, and the signature of this authority placed on the list.

## NOTES

## Definitions

### *Prefixes*

Anti	—against	Lith	—stone, calculus
Arterio	—artery	Leuko	—white blood cells
Arthro	—joint	Mal	—poor, bad, im- paired
Auto	—self produced within ones body	Myo	—muscle
Cardio	—heart	Nephro	—kidney
Cholecysto	—gall bladder	Neuro	—nerve
Chondro	—cartilage	Ophth	—eyes
Cyst	—any sac, especially one containing liquid or semi- solid	Ortho	—straight, normal
Contra	—against	Osteo	—bone
Derma	—skin	Oto	—ear
Dys	—difficult, painful	Peri	—around
Endo	—within	Pneumo	—lungs
Entero	—intestine	Psycho	—mind, mental
Ex	—out, away from	Phleb	—vein
Gastro	—stomach	Poly	—many
Hemi	—one half	Pyo	—pus
Hemo	—blood	Ren	—kidney
Hypo	—lack, deficiency, below normal	Retro	—backward, behind
Hepato	—liver	Rhino	—nose
Hyper	—above normal	Sub	—under
Hydro	—water	Trans	—across
Inter	—between	Uro	—urine, urinary tract
Intra	—within	Un	—not
		Uni	—one
		Vaso	—vessel, especially blood vessel

### *Suffixes*

-algia—pain	-ostomy—surgical creation of an opening into
-ectomy—surgical removal of	-pathy—disease
-emia—blood	-phobia—fear, dread
-esthesia—sensation	-plasia—growth or increase of a part
-itis—inflammation of	-plasty—formation of, plastic surgery of
-mania—insanity	-plegia—paralysis
-oma—morbid condition, tumor	-pnea—breathing
-orrhaphy—surgical repair of, suture of	
-otomy—surgical incision into	

### ***Suffixes—Continued***

- |                                      |                             |
|--------------------------------------|-----------------------------|
| -ptosis—a falling                    | -therapy—treatment          |
| -rhea—a flow or discharge            | -thermy—heat                |
| -scopy—visual examination, to<br>see | -trophy—nourishment, growth |
|                                      | -uria—urine                 |

## Administration of Medicines

The proper care of the medicine locker, which includes the cleanliness and arrangement of the contents, is important. The locker must be cleaned at regular intervals and in cleaning it is best to start at the top and work down. Only a few bottles should be removed at a time so that they may be quickly replaced if the locker has to be locked before its cleaning is finished. Each bottle should be wiped off before returning it to the shelf, paying particular attention to the neck and rim, and being careful not to deface the label. Each bottle should be properly stoppered as many drugs are combined with or dissolved in volatile substances and will become weaker or stronger if allowed to remain uncorked.

Keep the cabinet locked except when administering medicine. The senior hospital corpsman, his relief, or the nurse must carry the keys—never leave them in an unauthorized place.

### *Ordering Drugs*

1. The medicine cabinet should never be overstocked.
2. The contents should be examined daily—before sick call—and necessary drug supplies ordered.
3. Drugs given in small amounts should be ordered in small amounts, as many deteriorate if not fresh. Plan to have on hand enough drug supply for 24 hours or over week end.
4. Never wait until entirely out of a drug before ordering refill or new issue.
5. Any change in color, odor, or consistency should be reported.
6. Bottles should be securely corked and labeled, and arranged so that labels are clearly visible.
7. Any change in labels should be made by the pharmacy only.

### *Grouping Medicines*

For external use—(keep entirely separate).

For internal use—group according to use in the body.

*Poisons* (See that these bottles have proper poison labels, and are in bottles designated for poisons).

*Narcotics* (Keep in special locked cabinet at all times, and check off each tablet removed, in narcotic book, with date, name of patient, ward or department, and name of hospital corpsmen taking out drug).

*Stimulants* (Keep on hypodermic tray, and keep tray in a place known to all the ward staff).

*Drugs harmed by heat* (Keep in refrigerator: antitoxins, serums, suppositories, cod-liver oil, etc.).

### *Diluting Drugs*

For systemic or diuretic effect all drugs should be well diluted to aid absorption.

Drugs such as syrupy cough mixtures, given for a local soothing or sedative effect on the mucous lining of the respiratory tract are usually given undiluted—and given last, if there are other medicines to be given at the same hour.

Drugs given for a local effect on the stomach, are only slightly diluted.

Drugs containing iron or acids should be given through a glass tube held well beyond the patient's teeth, and he should be told to swallow the medicine directly as acid eats the enamel and iron stains it.

### **Medicine List and Cards**

Make a medicine list out of a large sheet of plain white paper and keep in cleaned x-ray film case. (Use a case so that both sides of list may be used and seen.) Draw lines in black or blue ink, and have spaces for the following:

Names	T. I. D., A. C. 6-11-4	T. I. D., P. C. 9-1-6	q 2 h 6-8-10-12-2-4-6-8
q 3 h 6-9-12-3-6-9	q 4 h 8-12-4-8	B. I. D. 6 a. m.-8 p. m.	Daily

**NOTE:** "Routine" hours may differ at different hospitals. Extra hours may be added on the back of the list.

Make medicine cards or tickets 2 inches by 2 inches (from back of index cards), on which write the patient's name, medicine to be given, amount, and hour or hours medicine is due. (Ether solution of paraffin will make tickets waterproof.)

Make a container or "drawer case" for cards out of empty medium-sized capsule boxes, secured three or four across and usually two deep, with adhesive or scotch tape across top, bottom, and sides, so that inner part of boxes will come out as needed. Label front of boxes according to the hours on medicine list.

**NOTE:** If more than one patient gets the same medicine in the same amount at the same time, names may be in same space, otherwise each patient must have separate space. Write names and medicines in pencil and erase as patients leave. Make new list every field day.

### **General Rules for Administration**

Get the medicine list, and cards with medicine due at that hour. Wash your hands! Assemble equipment at medicine cabinet—medicine tray with treatment towel folded in bottom; medicine glasses; drinking tubes; spoon; medicine droppers; minim glass graduate; gauze sponge; small pitcher of ice water; stirring rod.

Place about six medicine glasses on the tray and insert the corner of the medicine card under each glass (only corner of card so that remainder can be seen easily and to prevent possible soiling of the card).

Compare the cards—each in turn—with the medicine list. Get the medicine ordered and pour or place it as directed into the glass. (Do not put the top of the bottle down. Take it off between 4th and 5th fingers of right hand (palm upward) and hold it there while pouring the medicine.)

Put the glass on the corner of the proper card; then with a wet sponge wipe the side of the glass, if necessary, and the neck and mouth of bottle. Replace the top and return the bottle to the shelf. (Medicine will not be spilled if the neck of the bottle is held securely against the rim of the glass. Do not tip the glass.)

With the medicine properly prepared, and the correct medicine card under each glass, take the tray of medicines to the patients. Make sure of the identity of each patient. Dilute medicine at the bedside with cold water from a pitcher. Use a glass tube and a stirring rod as necessary.

### ***“Pointers”***

1. Medications should be given accurately and promptly. Have good light for preparation.

2. Measure exact amount ordered; use proper apparatus for measuring; give drops and minims as ordered.

3. Hold the medicine glass, with graduations toward your face and mark of the amount of medicine to be given even with your eyes to pour an accurate amount.

4. Never pour a medicine back into a bottle.

5. Never give a medicine from a bottle that is not marked. Never leave a medicine in a glass unmarked.

6. Never use fingers to handle pills or capsules. Place them in a glass with a spoon.

7. Never give a medicine if in doubt as to patient, drug, or dosage.

8. Give the medicine that you prepare and prepare the medicine that you give. (Remain to see that the patient takes the medicine and remove the glass at that time. Never leave medicine on a locker to be taken later.)

9. Know local and systemic action of medicines, and maximum and minimum dosage.

10. Know why a medicine is being given, effect desired, and symptoms of that effect.

11. Know symptoms of possible undesirable effects.

12. Know possible idiosyncrasy or susceptibility to certain drugs.

13. Know possible cumulative poisoning (some drugs are slowly excreted, and when given over a long period of time may have accumulated enough in the system to poison). Learn treatment for poisoning by these drugs.

14. Be familiar with habit-forming drugs.
15. Never record a medicine until after it has been given.
16. Report any mistakes immediately.
17. Always shake bottle before pouring medicine.
18. Stir the medicines which form a precipitate, with a stirring rod just before administration.
19. Remember the "FIVE RIGHTS."  
     RIGHT MEDICINE.  
     RIGHT DOSE.  
     RIGHT PATIENT.  
     RIGHT TIME.  
     RIGHT WAY.
20. Look at the label three times.  
     *Before taking the bottle from the shelf.*  
     *Before pouring the medicine.*  
     *After pouring, before returning the bottle to the shelf.*
21. Compare the medicine list twice daily with doctor's order book.
22. Repeat all verbal orders, and write at once in Doctor's Order Book.
23. Have the ward medical officer or the officer of the day sign before going off duty. Have other orders signed as written.

### **Medication by Inhalation**

Steam vapor containing a suspension of certain drugs is used in the treatment of various upper respiratory conditions. It acts by relieving irritation, inflammation, spasmodic contraction of bronchial muscles, congestion, edema, loosens secretions, relieve coughing, and soften thick, tenacious mucus, in the respiratory tract. The medication used most frequently is tincture of benzoin (4 cc. on a piece of cotton to a pint of boiling water).

Dry vapor inhalations are given to relieve spasmodic contractions of bronchi in asthma, to relieve contraction of coronary arteries in angina pectoris, in treatment of syphilis of throat, in administering oxygen, and gas anesthetics, etc.

Amyl nitrite usually used in angina pectoris comes in the form of ampules of very thin mesh-covered glass. One is crushed in its cover and held under, but slightly away, from the patient's nose for inhalation during attack. (Attendant must not inhale fumes.)

The inhalator may be standard equipment or may be improvised—a hot plate and any kettle with a spout, or a pan with a cover partially on—to supply the vapor. Inhalation may be administered under covering, or directly into room to keep the air moist, and for periods ranging from 5 minutes, 15 minutes, or a half hour for "covered" inhalation to continuously for the open method. The tent or covering may be improvised—a paper bag, with the edge turned down to protect the patient's face and the corner of bag cut out to fit over spout; or a bed cradle covered with a sheet placed over the patient's head and shoulders; or a sheet may be

placed over a mosquito rod and arranged as a canopy around the patient.

**Precautions:** Watch that the inhalator does not boil dry. Protect the patient from getting burned or scalded. Protect him from a draft and chilling after the inhalation is over. (Acetone or alcohol will remove benzoin.)

### ***Medication by Inunction***

Rubbing into the skin of an ointment, jelly or liquid for purpose of absorption for local or systemic effect. The most frequently administered medications are camphorated oil and methyl salicylate.

### ***Medication by Rectum***

**Suppositories:** Cone-shaped disks of material (usually medicated cocoa butter) which will dissolve at body temperature; to be inserted into the rectum for local or systemic effect, and must be inserted beyond the internal sphincter muscle.

**Proctoclysis:** Introduction of large amount of solution into the rectum by continuous drip, slowly enough for absorption by the mucous membrane. The solution may be tap water, or normal saline—given when the administration of fluids alone is desired; glucose 5 to 15 percent—given when food and fluid are desired; sodium bicarbonate solution 2½ percent—given with glucose in the prophylactic and active treatment of acidosis, or solutions plus stimulants when ordered. Temperature of solution should be 110° to 120° F.

The solution should be kept warm by folding a hot water bottle over the tube just before it enters the rectum. Regulate the flow by means of a clamp and drip bulb to 20 or 30 drops per minute. (Use a No. 18 catheter instead of rectal tube.) Secure the catheter with a strip of adhesive wrapped around it, then secure it to the buttocks. Give a cleansing enema first.

Place an abdominal pad with a wax paper base or a treatment rubber sheet with a cover under the patient's hips before beginning the treatment. Give proctoclysis 2 hours on and 2 hours off until specified amount has been given.

**Medicated retention enema:** Drugs such as paraldehyde, sodium bromide, avertin, chloral hydrate are given through a small glass funnel and a No. 16 catheter, and at body temperature.

Give a cleansing enema first. Dissolve the drug in small amount of water or starch solution and give it slowly.

**Subcutaneous Injection:** This method is used, when prompt action is desired; when medicine cannot be taken by mouth; when the drug is undesirably acted upon by gastric juices; when effect of drug is desired in area of injection (as for local anesthetic).

### *Procedure:*

1. Wash your hands!
2. Bring the hypodermic try to the place of preparation.
3. Get the drug—in empty capsule, or small drug envelope.
4. Fill a spoon with tap water, light the wick, and place a needle (point away from the handle) in a spoon and boil it for at least a minute. (Use 95 percent alcohol in the lamp; 70 percent in the syringe beaker and for sponges.)
5. Remove (with tissue forceps) an alcohol saturated cotton pledget from the container and place it near the tray.
6. Remove the syringe from the alcohol beaker, assemble it and place its tip on the cotton.
7. Cover the flame with the cap (do not blow it out), and remove the needle after it has boiled the required time (remove with forceps), and place it on the cotton pledget.
8. Rinse the syringe with boiled water from the spoon, leaving enough in the spoon to dissolve the drug (do not squirt the rinse water back into the spoon).
9. Draw up the boiled water from the spoon, as much as necessary into syringe. Pour out the remainder.
10. Place the drug in the spoon and gently squirt the boiled water onto tablet. Dissolve it with the tip of the syringe.
11. Draw up all the solution into the syringe and place the needle on syringe with forceps, giving it a twist to tighten.
12. Remove air bubbles, if any, holding syringe straight up and gently pushing on the plunger.
13. Fold the sterile side of cotton pledget around the needle, then take the syringe to the patient.
14. Select an area for the injection and cleanse it with a cotton pledget; check once more on air bubbles, then grasp a portion of arm, squeeze it to make the skin taut, and, holding syringe at a 45-degree angle, with the thumb and first, second, and third fingers, with the tip of the little finger resting on the patient's arm, insert the needle quickly. Loosen the pressure and, with thumb on plunger, inject the solution slowly. With the cotton pledget cover the area of the insertion and quickly pull the needle out. Rotate the tissue gently under the cotton for a half-minute, keeping the cotton stationary over the puncture wound.

**NOTE:** After cleansing the area and while the solution is being injected, keep the folded cotton pledget between 4th and 5th fingers of left hand. Give the hypodermic with right hand (unless you are left handed—in which case reverse the proceeding).

### *Precautions:*

1. Use strict sterile technic. Prevent infection.
2. Keep forceps and cotton pledget sterile, as well as syringe and needle.
3. Have a sharp, smooth needle, usually  $\frac{3}{4}$  inch by 23-gauge (no "fish-hook" tip).
4. Avoid injecting air into the tissues.
5. Don't bruise the flesh when grasping. Choose the outer sides of upper arms, and tops of the thighs for injections. Have adequate assistance when giving hypodermic to a delirious patient.

**NOTE:** In withdrawing a drug from an ampule, clean the container with an alcohol-soaked pledget squeezed dry. Prepare the syringe. File the tip of the ampule, then break it off through a cotton pledget or sterile gauze. Invert the ampule, holding it straight up, between second and third fingers of left hand. Steady it with the thumb. (Atmospheric pressure will keep the solution from spilling.) See that the plunger is all the way in the barrel of the syringe, insert the needle into the ampule, and withdraw the plunger, filling the syringe with the drug. Have graduations on the syringe toward your eyes.

In withdrawing a drug solution from a vial (with self-sealing rubber stopper or cap), do not remove the stopper. Clean the top with an alcohol pledget, then place a fresh pledget on top. Prepare the syringe. When ready to withdraw the drug, remove the cotton from the vial, hold the vial upside down and inject through the rubber stopper the same amount of air into vial as the solution to be removed. Pull down on the plunger to remove the required amount of solution, then withdraw the needle from the vial.

*Intramuscular injection:* This method is used, when a larger amount of drug is to be given than can be given immediately under the skin; when the drug is especially irritating to subcutaneous tissues, or not readily absorbed by them; when the drug is not suitable for intravenous injection.

The sites usually chosen for injection are the gluteal muscles for heavy drugs, and amounts larger than 0.5 cc.; the thoracic and deltoid muscles for injections in small amounts, and for less irritating drugs.

The syringe and needle should be boiled or autoclaved. The area of injection is prepared the same as for a subcutaneous injection. The equipment, too, is the same, except that the size of syringes and needles are usually larger varying with the amount and the type of drug and the condition of tissues. Fine needles are used for thin liquids and heavier ones for suspensions.

When preparing the gluteal area, visually divide the buttock into a circle and quarter it. Prepare an area 3 by 3 inches at the upper, outer quadrant.

When injecting a drug into the shoulder, arm, or thigh, hold the tissues as for a hypodermic injection, but grasping a larger area of flesh.

When injecting a drug into the buttocks, the tissue may be held as above, or drawn downward with an inward slant—the latter method is desirable for heavy metals. The patient must be relaxed to avoid tenseness of muscles—the prone position with the head to one side, and the feet turned inward, is perhaps best.

*Procedure:* Prepare the area. Draw 0.2 cc. of air into the barrel of the syringe, then hold it so that the air will rise to the top of the drug (aids diffusion, minimizes pain, prevents leakage).

Hold the syringe in the right hand between the thumb and first and second fingers, with the weight of the hand on the little finger,

which tip is resting on the skin. Draw buttock downward, with left hand, and insert needle quickly, slightly inward, and downward, deep into the muscle of the upper outer quadrant, and release the pressure.

Withdraw plunger slightly (aspirate for blood). If blood appears, withdraw needle and reinsert about an inch from the original site. If no blood appears, make the injection with slow steady pressure, followed by the injection of air drawn previously into syringe. Massage the area vigorously. Alternate areas of injection, in successive treatments.

*Hypodermoclysis:* The introduction of a large amount of fluid into subcutaneous tissues—on the front of thighs, below the breasts, or under the shoulder blades—and usually injected simultaneously at two points.

This method is used, when it is desirable to introduce fluid into the system rapidly, when the fluid cannot be given by mouth or rectum; in mild shock; in dehydration from hemorrhage, diarrhea, etc.; in acidosis; and in toxemia. Extra fluid dilutes toxins and flushes the kidneys.

Some of the solutions used are:

1. Isotonic solution of sodium chloride. (Normal saline.)
2. Dextrose 2 percent to 5 percent in normal saline.

The amount of the solution varies from 50 cc. to 1,500 cc. The temperature of the solution should be about 112° F. which is maintained by use of a hot water bottle of that temperature folded lightly over the rubber tubing just above the "Y" glass connection.

**NOTE:** If circulation is good, fluid is rapidly absorbed by the blood with results identical, though not so rapid, as when given intravenously.

*Procedure:* Strictly sterile technic must be maintained; all equipment and accessories are brought to the bedside; place an extra sheet (with a blanket if necessary) folded crosswise, over the patient's chest and upper thighs. Pull down the top linen to expose a 6 inch area of the thighs (other areas draped as necessary), and tuck the excess linen under at the foot. Place a rubber sheet across the lower linen over thighs.

Open the glove set and hypodermoclysis tray without breaking sterility and with sterile forceps set the skin preparation solution glass upright. Pour the preparation solution into it. Remove the sterile towel from the tray (aseptically) and place it over the rubber sheet, tucking the edge under the fold of the covers by touching the corners only.

Doctors will put on gloves, then hand the hospital corpsman the infusion bottle, to be hung on the irrigating stand about 3 feet above the level of the bed. The skin will be prepared, the air

removed from the tubing, and the needles inserted at about a 45-degree angle. A gauze sponge will be placed under each needle, which is secured over the hub with a strip of adhesive. The needle may be run through the sponge before insertion. A clean towel may be placed over area.

**PRECAUTIONS:** Watch the level of the solution to see that the fluid is running. Watch the areas of insertion of the needles to see that fluid is not running too fast—the rate of flow depends upon the circulation, upon the ability of the tissues to absorb the fluid. The areas should not become puffy or swollen, and *never* glassy (danger of gangrene). If puffiness develops, the flow must be slower, or stopped for a while. (Average rate 500 cc. in 30 minutes or an hour, or perhaps 1,000 cc. in 40 minutes).

Watch the patient's condition, and see that he does not displace the needles or the tubing. See that the level of the fluid does not become too low in the bottle—clamp the tubing when the solution reaches 1 inch from bottom of bottle.

*Intravenous:* Giving of fluid directly into a vein.

The objects of this method are: to raise the blood pressure; to supply the blood vessels with fluid to prevent injury to tissue cells following hemorrhage, to keep the remaining red corpuscles in circulation and to prevent the fatal loss of oxygen.

Some of the solutions most commonly used are normal saline, normal saline and dextrose 5 percent, dextrose 5, 10, 25, and sometimes 50 percent, and gum acacia 6 percent (substitute for blood or plasma). Dextrose added to the solution will supply the tissues with nourishment in a form that can be quickly used to produce heat and energy. If the patient responds properly to an intravenous, the volume of blood will be increased almost immediately, thus stimulating the heart, increasing the supply of blood to the vital centers in the brain, and supplying the depleted tissues with fluid.

#### *Causes of reaction:*

1. Pyrogens in the solution.
2. Improperly treated tubing.
3. Too rapid administration.
4. Unsuitable temperature of solution.
5. Too large amount given.
6. Alkaline impurities from glassware.
7. Foreign bodies in the solution.
8. Improper sterilization.

If the solution is administered drop by drop, it should be at room temperature but it should be 100° to 110° F. if it is administered rapidly. Temperature may be controlled by a hot water bottle around the tubing near the arm, and at the required temperature.

The amount ranges from 500 to 1,000 cc., with the rate of flow about 4 cc. per minute except in shock of hemorrhage—then in large amounts, rapidly, to bring the blood pressure to normal. See that the solution flows at the rate prescribed by the doctor.

*Procedure:* Strict sterile technic must be maintained. Assemble all equipment. Secure the arm to the arm board, if necessary—with pieces of 1-inch gauze bandage—at the wrist and above the elbow.

Place a rubber treatment sheet under the arm and cover it with a sterile towel. Place the tourniquet in position—just above the elbow, but do not tighten it.

When the doctor comes, open the glove and infusion sets without contamination. Prepare the patient's arm and place sterile towels around the site of injection. Remove the cap from the infusion bottle and attach the tubing, with glass connections to it. Hang the bottle on a stand about 3 feet above the bed, and remove the air bubbles from the tubing before the needle is attached, by removing the clamp, lowering the tubing and allowing the solution to fill the tubing and adapter. Air bubbles will rise to the top of the container.

Tighten the tourniquet, to dilate the vein (doctor might apply digital pressure). A separate needle will then be inserted in the vein, or a needle on 5 cc. or 10 cc. syringe, and as soon as the flow of blood appears, release the tourniquet. The doctor will attach the tubing to the needle, open the clamp, and establish the rate of flow. A gauze sponge is placed under the needle and both are secured with a strip of adhesive.

*NOTE:* If the vein is deep, the doctor may make an incision to expose it, so should have local anesthesia and dissecting sets.

#### *Signs of reactions:*

Chills; dyspnea; cough; pain in heart; cyanosis; cardiac dysfunction.

*Dangers:* infection embolism; dilatation of the heart.

*Precautions:* Same as for hypodermoclysis. Watch the patient constantly. Watch for signs that the needle has slipped out of the vein—tissues will become edematous and discolored. If a burette is used, refill from the flask as the solution reaches lower 50 cc. mark.

When the infusion is finished, clamp the tubing when the solution is 1-inch from the bottom of the container. Never allow the level to disappear into the tubing. Notify the doctor, who will remove the needle.

Note, and report immediately, any changes in the pulse, respiration, color, or if the patient becomes restless, nervous, or excited. Report any unfavorable signs.

## Transfusion

The site is usually the median basilic or cephalic vein on inner aspect of elbow.

### *Methods:*

1. Direct (Whole blood): Flows directly from the artery of the donor, through the apparatus, and into the vein of the recipient.

2. Indirect (Modified blood): Mixed with an anticoagulant such as sodium citrate 2½ or 4 percent—50 to 500 cc. blood. Blood can be used immediately, or kept under refrigeration for use later. It must be examined for excessive hemolysis, and filtered during the infusion. It should be at room temperature for administration, and it is usually administered simultaneously with an intravenous of normal saline.

*Symptoms of reaction:* Chills; rise in temperature; restlessness; anxiety; painful tingling sensations over the body; pain in chest; headaches; dyspnea; flushing of the face; coma and collapse. Allergic reactions include urticaria and edema of respiratory mucous membrane.

### *Preparation of Donor*

The donor must have a physical examination, including Kahn typing, hemoglobin, blood pressure, "TPR" and Rh factor and should not have eaten within 3 hours of giving blood. He should lie in a supine position on a table, the arm extended on support, and exposed.

Apply the blood pressure cuff upside down, and when the doctor is ready, inflate the cuff to 40 mm—higher if it is ordered. When the desired amount of blood has been taken, release the pressure in the cuff, and remove it.

**NOTE:** If for an indirect transfusion, the blood must be gently agitated to mix with the anticoagulant. The amount of blood depends upon the purpose of the transfusion and the condition of the patient—average amounts are 250 cc. and 500 cc. Stimulants, blankets, and hot water bottles must be available for the donor or the recipient, if necessary.

## Oxygen Therapy

### *The Oxygen Tent*

Equipment needed for the administration of oxygen includes:

1. Oxygen tent with a three-fourths-length canopy.
2. U. S. P. oxygen in commercial type cylinders, and a gauge by which the oxygen can be administered continuously and measured.
3. Ice, in pieces about the size of a small cocoanut—4" to 6" chunks—to cool air in tent. (Not necessary for "iceless" type.) Pail to catch the water from melting ice.
4. Thermometer for testing the temperature inside the tent.
5. "Wet-bulb" and "Dry-bulb" thermometers for determining the humidity.

6. Container for soda lime (about 2 pounds) to remove excess carbon dioxide—Analyzers for oxygen and carbon dioxide.

7. Large cotton sheet, folded lengthwise four times, for sealing the canopy over body of patient.

The bed must be made with idea of conserving oxygen, providing for the patient's comfort, and simplifying the work of the hospital corpsman. The equipment needed includes the usual bedding, plus: a full-length rubber sheet to cover mattress; a quilted pad to cover the full-length rubber sheet; a cotton sheet to cover sides at the top and head of the mattress; a cotton sheet to cover the remainder of the mattress, over the rubber sheet and quilted pad.

### *Care of Patient in Tent*

Place the patient in a comfortable position. (Fowler's position most comfortable usually.) Support him with pillows, if necessary. Keep him warm. Protect his chest and back—tie his pajama jacket at the back. Do not let cool air blow directly on him. Watch his condition closely.

Use the sleeves in sides of canopy for all nursing care and treatments within the tent. In passing articles through the sleeves have them opened only as much and as long as necessary. When working through sleeves secure them tightly around your arms to avoid loss of oxygen.

In bathing the patient's body, or making the bed, draw the canopy up under his chin, bring it under the pillow to the head of the bed, and tuck it securely under the mattress at the head. See that the cuff of the canopy conforms to the patient's neck. Give a complete bath. Keep a hot water bottle to his feet if necessary, and place his hands and feet in tub while bathing them. After the bath, dress him warmly, and when necessary, put on clean pajamas, remake the bed, and readjust the canopy to its original position.

Maintain an 8-liter flow of oxygen per minute for the first 25 minutes of the bath procedure, then a 10-liter flow for the following 25 minutes, unless otherwise ordered. Make an analysis of the oxygen concentration in the tent air before the bath is begun, and analyses at frequent intervals after the procedure is over until the desired concentration is reached.

#### **PRECAUTION:**

*Never allow a flame near the oxygen tent, nor anything which might cause a spark. Permit no smoking. Keep oil away from oxygen regulators and tanks. Don't run out of oxygen. Check the supply frequently. Keep the ice basket two-thirds-full to full. Replenish about every 2 hours.*

When filling the ice box, shut off the motor blower. Watch drainage from the ice tank—do not let pipe become clogged. Endeavor to maintain proper oxygen concentration. Check motor and gauge, frequently. Make an analysis of oxygen and carbon dioxide concentration every 6 hours.

Change the soda lime daily; it may be tested by bubbling air from the tent into red phenolsulphonephthalein solution. Change the soda lime at any time if the solution becomes yellow. When carbon dioxide reaches  $1\frac{1}{2}$  percent the soda lime must be changed. Be careful about the temperature and humidity inside tent. Regulate the shutter to maintain comfortable temperature.

NOTE: The average oxygen concentration is 50 percent to 60 percent; the proper temperature is between  $60^{\circ}$  and  $65^{\circ}$  F.; the carbon dioxide level should be below 2 percent—preferably below  $1\frac{1}{2}$  percent; the humidity should be between 40 percent and 60 percent—preferably 50 percent.

A 220 cubic foot-cylinder at 2,000 pounds pressure (full) with 6,200 liters, flowing at 6 liters per minute, should last about 17 hours; at 1,500 pounds pressure (4,650 liters) 12 hours; at 1,000 pounds pressure (3,100 liters) 8 hours; 500 pounds (1,550 liters) 4 hours. (4 liters in one gallon.) At 8 liters per minute, in above order: 12 hours, 9 hours, 6 hours, and 3 hours.

### ***Nasal Mask and Bag***

Secure the mask comfortably and make it air tight by rubber straps. Have an oxygen concentration in the bag before securing the mask. The liter flow should be sufficiently high that rebreathing bag does not empty completely upon inspiration. See that the bag moves with each respiration.

Remove mask about every 2 or 3 hours to wash the patient's face and apply powder or lanolin cream. Maintain desired concentration of oxygen. Check supply and flow frequently. A 6-liter flow per minute will give 70 per cent concentration with nose vent disk at 2. Oxygen increases as disk is moved from 1 to 4. Humidity is adjusted through gases exhaled into rebreathing bag.

NOTE: Before the regulator (any method of oxygen administration) is attached to cylinder, the cylinder valve should be opened slightly and closed quickly ("cracked") to blow out any dust.

### ***Nasal Catheter Method***

The regulator should have an attachment for a humidifying bottle. Keep this bottle one-half to two-thirds full. Six to 8 liters per minute are required to maintain oxygen dosage of 36 to 40 percent. (Two catheters are usually used for this strong flow.) Use a soft rubber catheter #10 or #12 F. with insertion tip perforated for 1 inch with small holes (use a red hot pin).

Lubricate the catheter sparingly with vaseline, and see that the openings are not plugged up. Insert the catheter to depth of distance between tip of patient's nose to tip of his ear. The catheter must not adhere to the inside of the nose. If the nostril is irritated, apply mineral oil or soothing ointment. Fasten the catheter in position over the cheek and brow with narrow strip of adhesive.

Remove catheter and replace it with a fresh one every 3 or 4 hours. Soiled catheters must be cleaned properly and boiled before being reinserted. A clean, freshly lubricated catheter should be inserted in alternate nostril at least every 12 hours.

### ***Cleaning of Equipment***

*Oxygen tent:* Wash the hood with warm soapy water, rinse, and air. Allow it to stand fully extended until dry. Do not fold. Empty the ice box, drain it completely, then wash it with warm soapy water, and rinse. The cover should remain off until the interior is dry.

*Nasal mask:* Clean with mercuric chloride solution 1:5,000, or mild soap and warm water. Rinse thoroughly, and hang it up to dry. Do not boil, use steam, alcohol, nor strong antiseptics.

## **Lumbar (Spinal) Puncture**

Spinal punctures are made to produce a therapeutic effect, for diagnosis, to produce anesthesia or for x-ray examination.

### **Gastric Lavage (Washing Out the Stomach)**

#### ***Purposes***

1. To cleanse the stomach of undigested food, fermenting material, and toxic and poisonous substances.
2. Indicated in persistent vomiting.
3. Indicated in some cases of chronic gastritis.
4. In acute dilatation of the stomach.
5. To prepare the patients for gastric surgery.

The solutions most commonly used are: sodium bicarbonate 20 percent; plain water; and normal saline.

**NOTE:** The temperature of solution should be from 100° to 106° F. The quantity should be from 1 to 3 gallons. When prescribed for cleansing purposes, the treatment is given until the return flow is clear. When prescribed in the case of poisoning, drugs which act as antidotes to the poisons should be added to the irrigating solution.

### **Gavage**

For the introduction of liquid food into the stomach through a tube passed into the esophagus through the nose or mouth. Gavage is indicated:

1. When the patient refuses food and health is threatened.
2. When conditions of the mouth or esophagus make swallowing difficult or impossible—such as carcinoma, stricture, spasm, obstructing growths, etc.
3. Following certain operations on the mouth when it is desirable to keep the mouth clean, dry, and quiet.
4. In prolonged unconsciousness.
5. In delirium.
6. In tetanus.
7. In poisoning, to administer an antidote.
8. Sometimes in feeding premature and weak babies.

## **Wangensteen Suction Drainage**

### ***Purposes***

1. To relieve prolonged nausea and vomiting.
2. To remove fluid and gas from the gastrointestinal tract, thus relieving or preventing distention.
3. To relieve prolonged hiccoughing.
4. Routine in gastric cases to prevent the above conditions.
5. To treat intestinal obstruction and peritonitis.
6. For uses in other cavities where gentle suction is desired.

### ***Pointers***

1. An air tight system is necessary to create a vacuum sufficiently strong to produce suction effect upon the stomach.
2. The greater the perpendicular distance between the level of the stomach and the drainage bottle, the greater is the suction (Negative pressure) exerted.
3. If three bottles are used, the material aspirated can be better examined and checked. Cleaning of the apparatus also is made more simple.
4. Oral hygiene is essential to relieve irritation of the mouth, nose, and throat by the tube. If the Levine tube is placed through the nose, there is usually no interference with eating or drinking, if that is allowed.

### ***Care of Patient During Treatment***

1. Keep the patient comfortable. Watch his condition—whether abdominal distention is relieved or increased, etc.
2. Keep the mouth and nose clean, and in good condition—lips and the nostril being used may be moistened with mineral oil.
3. Empty, measure, and note consistency of drainage at least once daily. If only two bottles are used, the amount of solution in the bottle at the start subtracted from the amount in the two bottles when drainage bottle is to be emptied leaves the amount of drainage.
4. When discontinuing treatment, watch for symptoms of retention—distended abdomen, pain, and signs of gas (belching, stomach “noises”, etc.) Clean the patient's mouth and face.
5. Keep apparatus clean.
6. Alternate suction about every 4 hours. Never let the top bottle become entirely empty.
7. Watch drainage bottle. Empty when three-fourths full.

### ***Care of Equipment***

1. Clean and stow the apparatus when treatment is finished.
2. Clean the tube inside and out with cold water, then boil for 5 minutes.
3. Rinse tubing thoroughly, and sterilize as directed.

NOTE: The aspirating bottle is emptied when three-fourths full so that the aspirated fluid will not be drawn up into the suction bottle to contaminate the water. If an automatic apparatus is used the valve can be cleaned by directing a jet of compressed air into each opening. Do not disassemble valve. See that the rubber tubes connect with the proper openings on the valve.

### ***Charting***

1. Type of suction.
2. Time treatment was started, and when discontinued.
3. Character and amount of drainage.
4. By whom treatment was started.
5. Condition of patient during and at end of treatment.

## **Gastric Analysis**

### ***The Fasting Specimen***

The examination of its contents is a widely used means of determining the pathology of the stomach. As vomitus is not always available, it is often necessary to introduce a tube (Levine or Reh-fuss) into the stomach to aspirate the contents. A 20- or 30-cc. syringe is used for suction. Aspiration is usually done in the morning before the patient has had food—this specimen is known as the “fasting specimen.” The normal stomach contains about 50 cc. of gastric juices at this time, and is constantly secreting more. Because the amount of gastric juice varies with, and secretion is influenced by food, test meals are often given.

### ***Fractional Analysis***

Stomach contents are aspirated every 15 minutes until fluid is free from food particles, or acidity returns to level of fasting content. The tube is left in until test is completed. When stomach is completely empty, it is often washed out.

### ***Test Meals***

Test meals are certain foods known to be digested by the normal stomach within a certain time. (A normal stomach will empty itself within 2 or 3 hours after an average meal.)

#### ***Purposes:***

1. To test the motor function of the stomach (speed with which food passes through, and whether within normal limits).
2. To determine the extent to which digestion has progressed within a stated time.
3. To test secretory action, and the chemical reaction of gastric juices.

### *Ethyl Alcohol 7 Percent Test Meal:*

Supper as directed. Nothing by mouth after midnight. Fasting specimen removed about 0800, marked properly, and sent to laboratory. Then 100 cc. of 7 percent pure alcohol is introduced into the stomach by Levine tube and syringe. (This alcohol should contain 1 cc. Topfer's reagent.) Aspirate 10- to 15-cc. after 20 minutes. After another 20 minutes, empty the stomach. (Test each specimen for free hydrochloric acid immediately after it has been removed.)

## **Enemas**

### *Cleansing Enema*

#### *Purposes:*

1. To cleanse.
2. To soften feces, relieve flatulence.
3. To hasten action of a cathartic.
4. To evacuate large intestine before certain treatments.

#### *Solutions Used:*

1. Tap water.
2. Normal saline.
3. Soap solution.

Use from 500 to 1,500 cc. of the solution; larger amounts would overdilute the bowels. The temperature should be 105° to 110° F. Use white floating soap and dissolve only a very small amount. Remove all froth and bubbles. Never use laundry soap or tincture of green soap.

#### *Procedure:*

1. Screen the patient. Bring all equipment to the bedside. (See "Trays" for equipment.)
2. Lower the bed unless otherwise ordered.
3. Cover patient with clean sheet or blanket. Fan-fold the top bed linen toward the foot of bed. (If bedding is left over the patient, it will become saturated with fecal odor.)
4. Get patient in position (Sims position preferably). Must be recumbent.
5. Place a rubber sheet with a cover under the patient's buttocks. Expose his rectum.
6. Lubricate the tip of the tube well. Unclamp the tube to expel air, then clamp it with fingers and insert gently 4 to 6 inches. (If there are hemorrhoids, be extra careful.) Unclamp the tubing.
7. As soon as the patient feels solution running, lower can to about 12 inches above his hips so that solution will flow slowly. (It should take 4 minutes to give a pint of solution.)
8. If there is griping, or desire to expel tube, shut the flow off for a minute until the discomfort subsides. Do not allow irrigating can to become empty.

9. At the completion of the flow, before the can is completely empty, clamp the tube and withdraw it quickly. Wipe the patient well with toilet paper. Try to have him retain the solution for 5 to 10 minutes.

10. Place the patient on a bed pan and remove the can and tubing.

11. When he is through, wipe the rectal area well with toilet paper. (Clean with soap and water when necessary.) Remove the sheet and cover, then replace top covers. Remove the blanket or sheet.

12. Inspect the contents of the pan for characteristics and abnormalities.

13. Stow the equipment.

#### *Charting:*

Record the kind of solution used and amount given; character of returns, and any abnormal reaction. Occasionally a patient may be unable to expel the solution. If this should occur, hot abdominal stupes may stimulate peristalsis, or the solution may be syphoned off by inserting an unattached rectal tube 4 to 6 inches and draining the fluid into a bed pan. Results this way are less satisfactory than normal expulsion of enema. It is a bad sign following operation—may indicate peritonitis, or, in typhoid fever, may indicate perforation of intestine.

### **Retention Enema**

#### *Types:*

1. *Nutritive:* Solutions of glucose 5 to 15 percent in normal saline, highly concentrated foods such as peptonoids, peptonized milk, beef juice, etc.

2. *Medicated:* Sodium bromide, paraldehyde, chloral hydrate, Avertin (rectal anesthetic), etc.

#### *Procedure:*

1. Screen the patient. Take all equipment to the bedside.

2. Turn the patient on his side, expose rectum. Place a rubber protector and abdominal pad under his buttocks.

3. Lubricate the catheter. Pour the solution into a funnel allowing it to run through the catheter to expel the air. Then clamp the catheter with the fingers and gently insert it about 5 inches into the rectum. Unclamp, and allow the solution to run in very slowly. Regulate the rate of flow by the height of the funnel. Never allow the funnel to become completely empty before refilling. When the solution has been taken, withdraw the tube quickly—wipe patient if necessary. Place a sponge tightly against his rectum; cover him but leave him on his side for about a half hour, if possible, to help him to retain the enema. Secure equipment. Chart treatment.

**NOTE:** Always give a cleansing enema about an hour before a nutritive or a treatment enema. The temperature of a retention enema should be about 100° F. Retention enemas must be given slowly and through a No. 16 or a No. 18 catheter. The maximum amount given should be about 150 cc.

### **Special Enemas**

#### *Carminative:*

To relieve distention and help in the expulsion of gas (*not to be retained*). Have the patient retain these enemas from 10 to 30 minutes, if possible.

1. *Milk and molasses*: Heat 100 to 250 cc. milk. To this add slowly an equal amount of molasses, stirring well and heating to 160° F. to mix thoroughly. Temperature of mixture when given should be 100° to 105° F.

2. *Water and glycerine*: 100 cc. of each—100° to 105° F.

3. *Olive oil and glycerine*: 100 cc. of each—100° to 105° F.

4. Olive oil 100 cc., glycerine 100 cc., turpentine 8 cc.—105° to 110° F.

5. Soap suds (soap solution) 1,000 cc., turpentine 8 cc.—105° to 110° F.

#### *Astringent:*

To destroy bacteria, and relieve inflammation (dysentery, chlorea, etc.). Give in the form of rectal or colonic irrigation. Let the solution run in slowly and gently, and then run out immediately.

1. Alum 60 cc., dissolved in 1,000 cc. hot water. Cool to 105° F. for administration.

2. Tannic acid, 2 Grams to 500 cc. water.

#### *Anthelmintic:*

To destroy or expel worms—the solution is to be retained 15 to 30 minutes. Give a cleansing enema first.

Quassia 4 cc., water 500 cc. at 105° F. Quassia has an astringent action on the mucus membrane of the rectum. It lessens the amount of mucus in which worms may lodge by shriveling and destroying them. If an enema is to be given daily until all worms are expelled, give only 250 cc. each day.

#### *Emollient:*

To soothe the mucous membrane of rectum—to allay local irritation of tissues. (Helps to check diarrhea.) This enema is to be retained.

Starch 4 Grams, water 180 cc. Dissolve the starch in a little cold water to make a smooth paste, then add 180 cc. boiling water and stir constantly. Let the solution cool to 105° F.

#### *Oil:*

To soften feces. This enema to be retained until there is bowel movement or cleansing enema is given.

1. Olive or cottonseed oil 300 cc. at 100° to 105° F.

2. Olive oil 180 cc., castor oil 60 cc. to aid softening. Give cleansing enema 2 to 6 hours later, if there is no bowel movement.

**NOTE:** Give these enemas through a No. 16 catheter and small glass funnel.

## Chills

Involuntary twitching of the voluntary muscles, accompanied by a rise in body temperature, and a feeling of severe chilliness.

#### *Some causes:*

1. Nervous reaction.

2. Toxemia, septicemia, pyemia.

3. Onset of certain diseases.

4. Certain inoculations.

5. Post operative complications.

6. Puerperal infection.

7. Formation of pus within the body.

*Treatment:*

1. Application of external heat (hot water bottles and blankets).
2. Hot drinks if allowed and tolerated.
3. Take T. P. R. immediately after chilling has subsided.

*Facts to note and record:*

1. Duration of chill.
2. Severity of chill.
3. T. P. R. (taken as directed).

## **Therapeutic Baths and Packs**

### ***Cold Sponge Bath***

*Purposes:*

1. To relieve discomfort.
2. To stimulate circulation.
3. To reduce temperature (continue treatment longer for this).

*Methods of application:*

1. "Wet hand" rub.
2. Large gauze sponge, or heavy wash cloth.
3. Water sprayed, or poured from pitcher over body.

*Temperature:*

According to the age of the patient, and his ability to react it should be 40° to 90° F.

*Equipment needed:*

1. Two extra sheets.
2. Two extra bath towels.
3. Large basin of water (temperature as directed).
4. One large rubber sheet.
5. Wash cloth or gauze sponge.

*Procedure:*

1. Screen the patient. Bring all equipment to the bed-side.
2. Cover the patient with an extra sheet, fan-fold top linen to the foot of the bed, and remove the pillow.
3. Place a rubber sheet, covered with a cotton sheet under the patient.
4. Remove the patient's pajamas, and drape loins with a bath towel. Remove the cover sheet. (If the patient wishes, cover sheet may remain, exposing only the parts being washed. Cover as reaction sets in.)
5. Rub the skin briskly, to stimulate circulation, prevent chilling, and to hasten reaction.
6. Place ice cap to the patient's head, and a hot water bottle to his feet.
7. Rubbing briskly, apply water to the patient's face, arms, chest and abdomen, taking a minute and a half for procedure, then sponge the lower extremities in the same length of time. Turn the patient on his side and sponge his neck, shoulders, back and legs, in 7 minutes.
8. When the bath is completed, replace the cover sheet and dry the patient well. Remove the towel from his loins and the treatment sheets from under him. Replace pajamas, pillow and top covers. Remove the extra cover sheet.

9. Give the patient a hot drink if permissible.

*Precautions:*

1. The patient's body must be warm before the treatment is started, to secure the desired reaction. The room must be comfortable.

2. Watch his color and pulse closely. Discontinue treatment if any unfavorable signs appear. Report the condition immediately.

## Hot Pack

(not often used)

*Purposes:*

1. To stimulate and relieve the kidneys.

2. To promote excretion through the skin of poisons due to suppression of urine (elimination of protein waste). Some diseases in which suppression may occur are: nephritis, uremic poisoning, bichloride of mercury poisoning, and eclampsia.

*Equipment:*

1. Large rubber sheet.

2. Four blankets.

3. Foot tub lined with a rubber sheet.

4. Five hot water bottles with covers.

5. Ice cap with cover.

*Procedure:*

1. Place the rubber sheet with a cover blanket under the patient. (Rubber sheet to neck height, and blanket about three inches higher.)

2. Place two blankets (one folded lengthwise four times, one crosswise four times) in a bath tub full of hot water (150° F.). Secure the ends outside the tub to keep dry.

3. Cover the patient with a blanket, and fan-fold the top bedding to the foot.

4. Remove pajamas, and take the patient's pulse.

5. Remove the blanket (folded crosswise) from the tub, by dry ends and with help, wring the blanket free of all excess water; place in the foot tub over one uncovered hot water bottle to keep it warm.

6. Remove the other blanket and wring it out as the first one. Place it in the tub, cover it with a hot water bottle, and an excess of rubber sheet. Take the tub to the bedside.

7. Open a full length blanket, and place it under the patient as directed in bed making. Fold the sides around the arms, legs and feet to separate the surfaces of the skin.

8. Open the second blanket to a double thickness, and place it over the patient, tucking the sides under him—as the cover blanket is removed.

9. Cover the patient with the sides of a dry blanket under him, then with the sides of a rubber sheet and pull up an extra blanket to wrap snugly around him.

10. Place an ice cap to the patient's head, a hot water bottle to his feet and two on each side (with covers).

11. Draw up fan-folded regular linen and arrange it neatly. Watch the patient's condition, taking his pulse frequently.

12. Leave him in the pack for 20 minutes, unless unfavorable symptoms appear.

13. Warm drinks, such as milk and cocoa, should be given during treatment.

*Removing patient from pack:*

1. Fan fold the top linen to the foot, and working under a dry cover blanket so as not to chill the patient, remove the top wet one. Dry the patient with a warm towel. Turn him and remove the bottom blankets and the rubber sheet. Dry the patient well. Put on his pajamas, then wrap him well in a dry cover blanket. Pull up the top linen and replace the pillow.

2. Leave the patient wrapped in blanket from  $\frac{1}{2}$  to 1 hour. Dry him with a warm towel before removing this blanket. Do not expose him at any time. Give him a warm drink.

NOTE: Temperature should be taken before, during and after the treatment.

### Sedative Pack—"The Cold Wet Pack"

#### *Method One*

1. Use the same foundation, cover blanket and arrangement of top covers as for a hot pack.

2. Remove the patient's pillow and pajamas. Place a folded hand towel over his pubic area.

3. Use wet sheets instead of blankets—at the directed temperature—and applied in a similar manner, except that the patient's feet should not be encased in wet sheets. Cover them well with the end of a cover blanket and apply a hot water bottle; ice cap to head. (Keep them properly filled.)

4. The temperature of the water should be 48° F. for robust patient, 60° to 70° F. for average patient, 92° to 97° F. for those of lowered vitality, and 108° F. for the elderly.

5. Sheets must be applied snugly around the neck, and over the body with no air pockets. See that all surfaces of the skin are separated and his arms are not under his body. Cover him well with the bottom blanket and a full-length rubber sheet with cover blanket wrapped snugly over all. Blankets insulate to prevent chilling. An extra blanket may be used if necessary.

6. The duration of the pack is from 20 minutes to 6 hours—average 2 hours.

7. Watch the patient's condition closely; remove him from the pack if any unfavorable signs appear. If he sleeps during the treatment and his condition remains good, do not disturb him unless ordered otherwise.

8. Increase his fluid intake a few hours before the pack and after the treatment is over. The patient may have fluids during the treatment, if desired. If treatment has to be stopped in case of urination or defecation, continue after interruption with fresh sheets and blankets until the allotted time is up—if patient's condition permits.

9. To remove the patient from the pack: Remove the wet sheets, blanket and rubber sheet without exposing the patient, or disturbing him more than necessary; dry him well; then put on his pajamas and straighten the bed. Give him a warm drink and make him comfortable.

NOTE: Sedative packs are contraindicated in organic heart disease, exophthalmic goiter, advanced arteriosclerosis, certain atrophic muscular diseases, paralysis, and old age.

### **Method Two**

1. Fan-fold the top covers to the foot of the bed. Place a large rubber sheet on the bed and cover it with a dry blanket placed crosswise so that the excess is on one side.

2. Place a second blanket folded crosswise on the lower third of the mattress, to cover the patient's feet.

3. Place a third blanket crosswise on the bed so that the excess is on the opposite side from the first one.

4. Wet three sheets—1 folded as a draw sheet—with the water temperature as directed. Place the sheets on the bed over the blankets with a draw sheet between. (Draw sheet crosswise, about 10 inches below the top edge of blankets.)

5. It is preferable to have the patient out of bed during preparation. He may be up if allowed. Explain the treatment to him, take his T. P. R., then remove his pajamas and drape him with a sheet. See that he voids before the treatment is started.

6. Place the patient in bed, and draw wet sheets quickly over his body. The left side of pack sheet is drawn over his left leg, under his right one, and across his body. Leave his arms free. The ends of the draw sheet are brought up between his arms and body, then over the arms and under the back, drawing his arms to his sides with palms against covered thighs. *The third sheet goes over body covering his right leg and feet.*

7. Fold blankets around the patient's body and up over his feet and tuck the sides under securely.

8. Protect the chin and neck with a face towel.

9. If the patient is uncooperative, diagonally folded sheets may be placed over the chest and knees, and secured to sides of the bed. He may have a rubber covered pillow in case.

10. Place a hot water bottle to the feet, and an ice cap to the back of his neck; cold compresses to his forehead; extra covers and hot water bottles, if necessary.

11. Have the room ventilated and darkened, and disturb the patient as little as possible. Take pulse and respiration every 30 minutes until relaxation occurs. Report any unfavorable signs. As soon as he shows signs of drowsiness, remove the ice cap and top covering to make him comfortable.

12. On removal of the pack, dry the patient, rub his body with alcohol, replace his pajamas and pillow and straighten his bed. Encourage him to rest. The duration of treatment is prescribed by a doctor.

13. Chart the time of treatment—when it was begun and finished—nature of the patient's reaction, pulse and respiration rates (before and during treatment), and sedative effects of pack.

## Sitz Bath

### *Purposes:*

1. To relieve congestion in pelvic organs.
2. To relieve pain following cystoscopic treatments.
3. To relieve retention of urine.
4. To relieve pain caused by hemorrhoids or operations on the rectum.
5. To relieve pain caused by renal colic.

### *Equipment:*

1. Two tubs. (One in which patient must sit, and the other for immersion of the feet.)
2. Two blankets.
3. Ice cap.
4. Bath towel.

### *Procedure:*

1. Remove clothes or pajamas and drape a blanket around the shoulders.
2. Fill both tubs with water about 110° F., and help the patient sit in the larger tub (Sitz tub if possible) immersed from waist to well below thighs.
3. Place the feet in the second tub, then drape a second blanket around exposed thighs and legs, enclosing both tubs.
4. Place an ice cap to his head. Gradually increase the temperature of the water in the tubs until 120° F. has been reached, if he can tolerate heat. (Never a higher temperature.)
5. Duration of bath—from 3 to 10 minutes for pelvic congestion; longer for other conditions.
6. Chart time and duration of bath, temperature of water, and patient's reaction to treatment.

NOTE: If foot tub is not used, keep patient's feet warm with a hot water bottle and a blanket.

## Convulsions

### (Spasmodic Movements of the Body)

*Clonic contractions* (Resulting from excessive irritation or irritability of motor centers of the brain): Alternating contraction and relaxing of muscles. Movements are abrupt and jerky—an exaggeration of natural contractions.

*Tonic Contractions* (Resulting from irritation of motor centers of the spinal cord): Persistent contraction of a muscle or set of muscles, long continued.

*Local Convulsions*: Confined to one muscle or to one group of muscles—usually called a spasm.

*General Convulsions* (Due to irritation or irritability of motor centers of the brain): Characterized by unconsciousness (epileptiform).

*Tetanic Convulsions*: May result from tetanus, cerebrospinal meningitis, or strychnine poisoning. Convulsion often assumes form known as "opisthotonos"—in which head and heels are bent backward and body bowed forward.

## ***Clonic Convulsions***

### *Causes:*

1. Organic brain disease—tumor, gumma, abscess.
2. Injuries to the brain, pressure on the brain, apoplexy, cerebral anemia—resulting from profuse hemorrhage, or from certain forms of heart disease causing extremely infrequent pulse, as in heart block.
3. Epilepsy, idiopathic.
4. Intoxications (toxic substances in the blood), such as uremia, eclampsia, alcoholism.
5. Reflex irritation resulting from acute gastric disturbances, intestinal parasites, teething, adherent prepuce, onset of an acute disease, high temperature, etc.
6. Hypoglycemia.

NOTE: The above convulsions are usually epileptiform in character.

## ***Tonic Convulsions***

### *Causes:*

1. Tetanus.
2. Strychnine poisoning.
3. Spinal meningitis.
4. Hysterical seizures.
5. Occupational hazards, such as chemical, lead and arsenic poisoning.

### *Treatment:*

1. Place the patient in a recumbent position, with his head slightly elevated. Protect him from injury.
2. Place a mouth gag between molar teeth (be sure tongue and lips are clear).
3. Loosen patient's clothing, especially at the neck. Give him plenty of fresh air.
4. Guide movements to prevent injury, but do not restrain.
5. After attack, look for any local irritants, report and record.
6. Treatment of underlying cause.
7. Chloroform is sometimes given for relief of severe convulsions. Avertin for extremely severe convulsions, as in tetanus.

Particular conditions which should be watched for during convulsions, and recorded:

1. The most important part of the attack is the beginning: always state whether beginning was observed.
2. Time and duration of attack, and frequency of convulsions.
3. Onset of attack—whether sudden or gradual; whether preceded by movement; where twitching or stiffness began; the muscles first affected and the order in which others are involved (what parts are involved).
4. Type of movement present—whether local or general (if local, the parts affected); clonic or tonic; whether one follows the other, or are co-ordinate; whether body is relaxed or rigid.
5. Whether the patient is conscious, semi-conscious, or unconscious—if unconscious, for how long.

6. Position of head—whether motionless, rolling or turning—if turning, in which direction.

7. Whether eyes are open, closed, fixed, blinking or squinting (position of eye balls). At the beginning—size of pupils: whether normal, dilated, contracted, or uneven, or whether pupils react.

8. Color, expression (any contortion), or any twitching of face.

9. Color of lips, and any distortion of mouth or clenching of teeth. Any frothing at mouth.

10. Character of pulse, respiration, and blood pressure. Any changes in them.

11. Any incontinence.

12. Any opisthotonos.

13. Any areas of hyperesthesia, hypoesthesia, or anesthesia.

14. Degree of perspiration, if any.

15. Time and manner of termination of attack.

16. Condition of the patient after attack—any speech difficulty, any paralysis of arms or legs. Was the patient drowsy; did he sleep after the attack; any Cheyne-Stokes respirations; length of time in returning to normal.

17. Any complaints (subjective symptoms).

## Epilepsy

A condition characterized by periodic attacks of unconsciousness or disturbed consciousness, with or without convulsions, and excited by abnormal discharges of electric activity from motor cells of the brain—perhaps of hereditary neuropathic origin—and may be precipitated by emotional excitement, undue physical or mental exertion, indigestion, constipation, toxic conditions. The major types are:

1. Idiopathic—true, or typical. Severe epilepsy.

2. Jacksonian—marked by localized spasm, and mainly limited to one side, and often to one group of muscles. Mild epilepsy.

## Grand Mal

### *Symptoms:*

1. Convulsion usually is preceded by warning symptoms; the patient emits a shrill cry, turns pale, falls to floor unconscious.

2. Tonic spasm, with head rotated and retracted, limbs forcibly extended, thumbs turned into palms and firmly clenched by fingers.

3. Respiration ceases for a few seconds, patient becomes cyanotic, then respirations become stertorous.

4. Movements become clonic in character, and are jerky, rapid, and often violent.

5. Tongue is often bitten, saliva frothy and frequently blood-streaked.

6. Incontinence of urine.

**NOTE:** At end of the attack the patient may remain in a coma for a while; or he may recover rapidly, may complain of mental confusion or headache; he may enter a trance-like state, or the attack may be followed by epileptic automatism, delirium, violent assaults, or by transient paralysis.

## ***Petit Mal***

The seizure usually consists of momentary unconsciousness, sometimes accompanied by pallor, or an obscuring of consciousness represented by a dreamy state, or by a sudden sensation of fear or horror.

### ***Treatment:***

1. Hygienic treatment—fatigue should be avoided, bowels regulated; he should take moderate exercise and pursue an occupation which does not involve strenuous labor.

2. Local irritants should be sought and removed.

3. Fluids should be restricted. He should follow a fat and vegetable diet, with carbohydrate and protein reduced to a minimum. This tends to reduce intestinal putrefaction, thus lessening epileptic seizures.

## ***Hysterical Seizures***

These closely resemble true epilepsy, or other forms of convulsions, but differ from others in that although the patient appears to be unconscious, he seldom is, and will often respond to suggestion. His movements are usually tonic, the pupils react to light, there is no incontinence, no biting of the tongue, no frothing at the mouth, nor any change in pulse and color of the face. The patient may fall, but in a manner so as not to injure himself. Attacks are usually not sudden, and may be prolonged. There may be screaming, laughing, or crying, during the attack, and the patient is often excited after the attack is over. (In epilepsy, patient usually sleeps for an hour or more after attack.)

## NOTES

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

# ANESTHESIA

*Anesthesia* is the state in which total or partial loss or absence of sensation exists. It may be the result of disease or injury or of the administration of an agent known to cause an absence of sensation. It is known as general or regional, according to the degree of insensibility to feeling.

## *Approximate Times Required to Anesthetize*

- Ether—10 to 30 minutes.
- Chloroform—4 to 10 minutes.
- Nitrous Oxide—1 to 4 minutes.
- Ethylene—1 to 4 minutes.
- Ethyl Chloride—1 to 4 minutes.
- Cyclopropane— $\frac{1}{2}$  to 3 minutes.
- Rectal— $\frac{1}{2}$  hour.
- Intravenous— $\frac{1}{4}$  to  $\frac{1}{2}$  minute.

## *Methods of Administering General Anesthetics*

*Open drop*—For liquid anesthesia.

*Semi-closed*—For administration of ether only.

*Vapor or gas* (administration with a mask, through an anesthesia machine)—Gas anesthesia, often combined with ether vapor.

*Intrapharyngeal*—Especially for operations on lower face and mouth.

*Intratracheal*—For operations on the head, face, neck, lungs, throat, etc.

## *General Anesthesia*

*Periods:*

1. Induction—From the beginning of the administration of the anesthetic to the loss of consciousness (beginning relaxation).
2. Maintenance—Surgical anesthesia.
3. Recovery or death.

*Stages:*

1. Analgesia is the stage of beginning anesthesia. It is characterized by a loss of the sense of pain without a loss of consciousness or sense of touch. (Used often in dentistry and obstetrics).
2. Excitement or delirium (the dream stage).
3. Surgical anesthesia (maintenance). In four planes.
4. Respiratory paralysis.

**NOTE:** The recovery of the patient is evidenced by a return of reflexes—rigidity, swallowing, retching, vomiting, eye reflexes, consciousness. The patient passes gradually from one stage to another, and one plane to another. The anesthetist must observe the patient closely to have control of the anesthetic.

## *Administration of Ether*

*Materials and equipment:*

1. Can of ether opened, but stoppered.
2. Metal top grooved, or cork with wick, for dropping ether. (4 extra cans of ether.)
3. Gauze or stockinette covered mask—use only 8 layers of gauze.
4. Metal airway.

5. Soft rubber catheter (No. 20) for nasal airway.
6. Vaseline gauze, and rubber strip, for eyes.
7. Oxygen, and apparatus for administering it, if necessary.
8. Oral screw—tongue depressor mouth gag.
9. Tongue forceps.
10. Two emesis basins—gauze sponges.
11. Sponge holding forceps.
12. Syringe, 20 cc., with No. 20 catheter for aspiration of mucus.
13. Hand, or field towels, folded lengthwise four times.

#### *Procedure:*

1. Place a cover over the patient's eyes, then apply the mask snugly over his nose and mouth (first having removed any false teeth).

2. Drop the ether—slowly at first—but with increasing speed, as the patient is able to tolerate the vapor. A steady, fairly slow, continuous flow of drops should be used at an approximate rate of 12 drops the first minute, 24 drops the second minute, 48 drops the third minute, and 96 drops the fourth minute until patient is asleep, then slow down.

(NOTE: Do not sprinkle ether on mask, nor pour it on at intervals, as a spasmodic supply produces over-etherization or partial recovery, which hinders the patient or the surgeon. A uniform series of drops is necessary for smooth, even, anesthesia—the rate to be increased as operation procedures demand. Never saturate the mask so that liquid ether will drop on the patient's face.)

3. In an adult, after about the first 4 minutes of anesthesia, one or two hot, wet towels folded lengthwise four times may be placed slowly about the mask—leaving the gauze at top still exposed—to concentrate the vapor. (Semi-closed method.) Dry towels may replace wet ones during maintenance. This method limits waste of anesthetic vapor, and retains some of the carbon dioxide which is lost in the open drop method. The ether, being concentrated, induction is faster, and less ether is necessary. Do not force anesthetic faster than the patient can take it.

4. Increase drops for opening and closing peritoneum, pulling on intestines or organs, or when surgeon dilates the sphincter muscles, as anesthetic must be deeper for these manipulations.

5. Slower drops after manipulation is over, and still slower after peritoneum is closed. Drops may be stopped after the closure of subcutaneous tissue (usually) and mask may be removed when the surgeon is nearly through suturing the skin.

#### *Signs of anesthesia:*

1. Respirations—Respiration is a valuable guide to the depth of anesthesia. Respirations may be regular or irregular, jerky or even, during induction, but are deep and regular during maintenance. Beyond, this stage, respirations do not lose their rhythm, but become more and more shallow if too much anesthetic is given. Maintain a free airway at all times—by holding chin up, and patient's tongue forward when necessary, by use of the metal airway, or by nasal catheter. Anesthesia is lightened, and respirations become faster and sometimes irregular and jerky (if anesthesia has been light) when the surgeon is pulling on major muscles, peritoneum, intestines or organs.

2. Eyes—Watch eyes closely (keep them closed except when examining pupils.) Watch both eyes as one may be false, or have had an old injury

with resultant "fixed" pupil. During the first and second stages of the anesthetic the eyeball undergoes period of excited activity—moving from side to side, or fixed unnaturally. When surgical anesthesia has been reached, the eyeball movement ceases. Pupils react to light in shallow and moderately deep anesthesia. They do not react in dangerously deep anesthesia. During induction, the pupils may be contracted or dilated, the size depending to a great extent upon preoperative medication, but dilates during surgical anesthesia with amount of ether given. If the anesthetic is "pushed" in presence of fixed eyeball, with or without dilated pupils (which do not react to light), the danger stage is present. During induction, the eyelid, when raised, will attempt to close immediately, or after a few seconds exposure to light. In surgical anesthesia, this reflex is absent. Protect the patient's eyes from ether burns, and from danger of injury from mask by a gauze face piece (about 10 or 12 thicknesses), covered with a piece of rubber tissue.

3. Swallowing—Swallowing, after the patient is unconscious, may occur during a light anesthetic, and is usually a preliminary to vomiting. Do not increase anesthetic too fast at this stage as laryngeal spasm may occur.

4. Vomiting—Vomiting may be caused by too slow and uneven an induction, or by the anesthetic getting light from deeper anesthesia because of the surgeon pulling on major muscles or the intestines. If the patient vomits during the anesthetic, turn his head to the side, see that his mouth is open (oral screw and tongue depressor mouth gag may be used) lower the head of the table, and have suction apparatus handy. Wipe mucus or vomitus out of throat when necessary with sponge holding forceps. (Induction vomiting is reflex, recovery vomiting is toxic.)

5. To much emphasis cannot be placed upon the danger of aspiration of vomitus. Its prevention depends upon carrying anesthetic rapidly and smoothly through induction and well into first plane of maintenance. The anesthetist must guard against aspiration of blood, mucus, saliva, vomitus, or against asphyxia from any other cause—respiration obstructed by tongue falling back, or relaxed jaw sagging, or from pressure on trachea or chest.

6. Know your signs of anesthesia, and whether or not there has been sufficient time for anesthesia. Be sure the patient is anesthetized before allowing the surgeon to prepare field of operation, or to begin surgery. Allow no manipulation of linen until patient is anesthetized. Hysteria, in second stage of anesthesia, may assume the appearance of quiet, surgical anesthesia. This is known as "false anesthesia" and any preparation of the patient at this stage is dangerous. The "dream stage"—earliest loss of consciousness, with control centers abolished—is a potential danger stage in all general anesthetics.

#### *Dangers of a general anesthetic:*

Some of the dangers of a general anesthetic are physical injury, during the stage of excitement, or during light anesthesia; the danger of the patient biting his tongue or lips, or breaking off portions of his teeth. Other dangers are respiratory failure, shock, pharyngeal spasm, laryngeal spasm, tongue falling back, aspiration of debris (vomitus, blood, pus from incision and drainage of peritonsillar and pharyngeal abscesses) tracheal collapse, convulsions, embolism, aspiration of liquid ether into the lungs, injuries to the eyes, too much anesthetic, and anesthetic explosion. The greatest danger is aspiration of vomitus. Watch your patient constantly, observe the rules of administering a smooth, even anesthetic, and unless something unforeseen happens, your anesthetic will be a safe and satisfactory one.

## NOTES

# SURGICAL NURSING PROCEDURES

The patient's freedom from discomfort following an operation, depends to a large extent, upon his preoperative condition and preparation. In all cases, the surgeon will leave definite preoperative orders, but there are a few standard and routine procedures which must be accomplished. These vary with the type of operation to be performed and with the desires of the surgeon. In general, however, they include:

1. A cleansing bath, usually given on the night before.
2. An enema as ordered.
3. A light supper on the evening before the operation with nothing by mouth after midnight, unless otherwise ordered.
4. Accomplishment of the necessary laboratory examinations.
5. Preparation by shaving the skin in the operation area—the area shaved should be amply large. It is better to shave more than is necessary than not enough.

## *Early Preparation (Day of Surgery)*

1. Extra A. M. care—partial sponge bath, clean pajamas.
2. Check T. P. R. and blood pressure (see if the patient has a cold).
3. Check valuables, list, and stow correctly.

## *Final Preparation*

1. Prepare and be ready to give the hypodermic ordered (give it as the patient leaves for the operating room, unless otherwise ordered.)
2. Check voiding  $\frac{1}{2}$  hour before operation. If the patient is unable to void, report to ward medical officer in time for the patient to be catheterized if the surgeon desires it.
3. Remove any false teeth, and place them in gauze or a glass of water; retain them in the patient's locker.
4. Complete charting of all care, treatment, and medications. Send chart with patient. Have any pertinent reports attached to his chart.

## *The "Recovery" Bed*

1. Foundation as for regular bed (with draw sheets).
2. Place a rubber sheet (may be an extra draw sheet) across the head of the bed to extend under the patient's shoulders. Tuck any excess under at the head and sides. Cover this with a cotton draw sheet, overlapping the bottom about 3 inches with the open side tucked under the mattress at the head.
3. Place a large blanket across the bed, even with the foot, and tuck it under at the sides, leaving a  $\frac{1}{2}$ -inch edge to grasp when removing.
4. Place three covered hot water bottles in the bed (at the head, middle and foot) and wrap clean pajamas around one of them.
5. Place the top linen on the bed, but do not tuck it in. Fold the blanket under slightly at the top, then turn in the edge of the spread under the fold of this blanket, and cover both with a 12-inch fold of the top sheet.

6. Turn the linen up at the foot even with the edge of the mattress.
7. Turn the linen up at the side—toward the door—even with the edge of the mattress (fold open edges under slightly); then:
8. Fan-fold the linen neatly (12-inch folds) to the side of bed away from the door.
9. Secure a pillow upright against the head of the bed with a 1-inch bandage.
10. Remove the hot water bottles when the patient returns, cover him with the fan-folded linen, secure it at the foot, and miter the corners. Do not replace the hot water bottles unless indicated.
11. Remove the excess blanket after the patient has recovered from the anesthetic, and excess perspiration has subsided.

**NOTE:** In cold weather, and if the patient's condition is not good, use two extra blankets, and let him lie between them. When removing, remove the bottom one first; then about 20 minutes later, the top one. After making bed, place following on bed-side locker: Emesis basins (2); memo pad; pencil; thermometer in alcohol; clock; oral screw; mouth gag; gauze wipes; paper bag (secured to the side of the bed).

### *Post Operative Care*

1. Place the patient in the "recovery" bed.
2. Know the nature of the operation, as the entire course of post-operative treatment depends upon it.
3. Know where the wound is located to avoid strain upon it.
4. Know if there are any drainage tubes, to guard against dislodging them.
5. In operations of the gastro-intestinal tract, know if the stomach has been opened—if so, vomitus will be bloody. Watch for hemorrhage.
6. Nothing by mouth for gastro-intestinal patients until ordered by doctor.
7. Keep the patient quiet, warm, and dry. Protect him from drafts.
8. Take T. P. R. immediately, then pulse every 15 minutes for about 2 hours, or for as long as necessary.
9. Take blood pressure immediately, then every 15 minutes (if spinal anesthesia) and in other cases as necessary, until patient has reacted or pressure is restored to normal.
10. Watch for delirium sometimes caused by certain drugs.
11. Turn the patient's head to the side if he vomits. Note the amount and nature of vomitus, and record it.
12. Hold his jaw up and forward if necessary for clear breathing (an airway in his mouth, or a nasal catheter will help at times.)
13. Begin post-operative treatment as ordered.
14. Attach any drainage apparatus when suction is to be started, or drainage to be collected in a bottle. Watch these tubes frequently for hemorrhage.
15. Inspect dressings frequently for signs of hemorrhage.
16. Keep an accurate and intelligent record.
17. Change his position frequently to guard against pneumonia, bed sores, or formation of adhesions.
18. Do not let an unconscious patient have a pillow—wait until he has fully reacted.

19. Check orders for the position of spinal anesthesia patient.
20. Chart and report first voiding. If he is unable to void after the first 8 hours, report it.
21. Report any alarming or peculiar symptoms at once.
22. Encourage deep respirations for 5 minutes every hour.

## **Post Operative Discomforts**

### ***Headache***

#### *Causes:*

1. Effect of anesthesia.
2. Nervousness.
3. Fatigue.
4. Confusion.
5. Excitement.
6. Poorly ventilated room.

#### *Treatment:*

Quiet rest, fresh air, ice cap to head, hot water bottle to feet, medications if very severe.

### ***Backache***

#### *Causes:*

1. Uncomfortable position on operating room table.
2. Undue strain during surgery.
3. Lying in one position too long.

#### *Treatment:*

1. Careful lifting of patient.
2. Frequent change of position.
3. Alcohol back rubs (straighten out binders—remove for back rub.)
4. Pillows for support—at back, between knees, under abdomen.

### ***Thirst***

#### *Causes:*

1. Dehydration.
2. Pre-operative hypodermic.
3. Anesthetic.
4. Profuse perspiration.

#### *Treatment:*

1. Moisten lips with sponge dipped in cold water.
2. Mouth wash—caution patient not to swallow mouth wash.
3. Cracked ice to hold in mouth—not to swallow if ordered nothing by mouth.
4. Water by mouth, if allowed, otherwise parenteral fluids.

### ***Nausea and Vomiting***

#### *Causes:*

Usually follows general, and sometimes local and spinal anesthetics.

*Treatment:*

1. Deep breathing exercises to eliminate anesthetic as soon as possible.
2. Morphine to rest patient, if necessary.
3. Wangenstein suction drainage, if nausea persists.

***Restlessness and Sleeplessness***

*Causes:*

Any of the above discomforts; pain, worry, reaction, are some causes.

*Treatment:*

Above treatments, reassure patient, help him relax by alcohol back rub, straightening bed, shaking up pillows, morphine, or a barbiturate as ordered.

***Pain***

*Causes:*

1. Wearing off of anesthetic.
2. Trauma from manipulations, or manual procedure during the operation.

*Treatment:*

1. Change of position.
2. Use abdominal binder for support.
3. Prevent coughing, or vomiting, as much as possible. Protect the incision when the patient retches by making pressure with hands on each side of incision—about 3 inches away, and on dressings over wound—gently pressing toward incision, to help prevent strain upon it as he coughs or vomits.

***Abdominal Distention with Accompanying Gas Pain***

*Causes:*

1. Shock from operation.
2. Taut muscles.
3. Remaining in one position too long.
4. Sluggish peristalsis.

*Treatment:*

1. Rectal tube (insert about 3 inches with the other end in a urinal; lower than the body).
2. Hot water bottle to the abdomen.
3. Frequent change of position.

**Post Operative Complications**

***Shock and Hemorrhage***

For a description of shock, hemorrhage and their treatment, see pages 5 and 13.

***Pneumonia***

*Causes:*

1. Infection carried to lungs from infected area of operation.
2. Aspiration of vomitus.

3. Irritation of lungs by anesthetic.
4. Patient becoming chilled.
5. Patient lying in one position too long.
6. Result of a cold which patient might have had at time of operation.

*Symptoms:*

1. Rapid pulse and respiration.
2. Elevated temperature.
3. Productive cough.
4. Pain in chest.
5. Symptoms usually appear on third day.

## ***Other Complications***

Among other complications which may arise following a surgical operation are: intestinal obstruction, peritonitis, tympanites (distention of the abdomen due to gas), suppression of urine, retention of urine, infection, thrombophlebitis, or an embolus. These complications will be noted by the medical officers and appropriate treatment will be ordered for their relief.

## ***Peritonitis***

*Symptoms:*

1. Patient appears toxic (general poisoning of blood due to absorption of bacterial products).
2. Sudden onset of abdominal pain.
3. Tender, rigid, board-like abdomen.
4. Increase in temperature, pulse, and respiration—pulse weak. Increasing abdominal distention.

*Treatment:*

1. Fowler's position—to localize inflammation.
2. If wound is draining, frequent change of dressings.

## ***Tympanites***

Paralysis of the peristalsis, with distention of the abdomen due to gas and feces (alertness and good nursing may prevent). Watch for signs of distention, and begin treatment before serious trouble begins.

*Symptoms:*

1. Abdominal pain and discomfort.
2. Abdominal distention.
3. Respiratory difficulty.
4. Increased pulse and respiration rate.

*Treatment:*

Insertion of rectal tube (change patient's position frequently).

## ***Suppression of Urine (Failure of Kidneys to Function)***

*Symptoms:*

1. At first urine is scanty.
2. Headache, dizziness, impaired vision, nausea, restlessness.

3. Puffy under the eyes.
4. Later urine is absent entirely.
5. Patient becomes delirious, drowsy, has muscular spasm, then
6. Convulsions, coma, and death—unless he responds to treatment.

### ***Retention of Urine (Inability to Void)***

#### *Methods to induce urination:*

1. Give warm drinks or small amounts of hot water.
2. Let patient hear running water.
3. Let patient immerse hands in warm water.
4. Hot water bottle over bladder area.
5. Enema or Sitz bath—only on order from doctor.

### ***Infection***

#### *Causes:*

1. May be due to conditions existing before operation.
2. May be due to bacteria introduced into wound during or following operation—may be local or general.

#### *Symptoms:*

1. Sharp rise in T. P. R.
2. Abdominal pain or discomfort in area of operation.
3. Abdomen may be distended.
4. Drainage from incision.

### ***Thrombophlebitis***

#### *Symptoms:*

1. Cramp-like pain, and swelling of the limb.
2. A lump may be felt under the skin in painful area.

#### *Treatment:*

1. Do not rub, massage, or bathe limb.
2. Elevate limb on pillow—keep the patient and the limb at ease.
3. Immobilize the limb with sandbags or pillows.
4. Application of heat—dry or moist.

NOTE: Thrombophlebitis may be prevented by patient getting out of bed in early days after operation, if permitted by the surgeon.

### ***Embolus***

#### *Symptoms:*

1. Sudden onset, collapse.
2. Pain in chest.
3. Acute sudden respiratory distress.

#### *Treatment:*

Complete bed rest—Fowler's position if necessary.

## **Orthopedic Nursing Care**

1. Protect the body against interference of cast, splint, or frame with padding.

2. Keep the patient clean and dry. Prevent crumbs from getting under the cast. Watch for pressure sores.

3. Turn the patient frequently, *after* the cast is dry. (Do not move the patient until the cast is dry.)

4. Watch circulation of affected part. (Toes or fingers)—coldness, numbness, cyanosis or pain at some pressure point. Report at once.

5. Watch new cases for symptoms of shock or hemorrhage.

6. Give special care to bowel elimination. Take precautions to prevent body or high casts from getting soiled upon elimination.

7. Never change or remove traction, weights, or splints except under orders or direction from the ward medical officer.

8. Report promptly any complaints of orthopedic patients.

9. Diet should include foods of high calcium content.

10. Do not place a patient in a cast on a mattress that sags from the sides or ends, because of danger of cracking the cast.

11. In turning a patient wearing a plaster spica cast, take care to: Move the patient to the side of the bed nearer the enclosed hip; turn in an "arch" movement; prevent strain on hip or toes of affected extremity. The patient's foot should be outside of the bed when he is lying face down, or a pillow should be placed under his leg to avoid digging his toes into mattress. Turn the patient as though he were a poker which cannot be bent in the middle.

12. When casts are applied to the lower extremities, protect toes from weight of bed clothes by use of a "cradle."

13. After application of a cast, remove remaining skin "prep" solution to permit observation of fingers and toes.

14. Patients in body or shoulder spicas should have boards under their mattress to prevent sagging.

15. In shoulder spica cases, do not move a patient by applying force to his affected arm. (Move the patient with one hand under his head, the other under his unaffected arm.)

16. In moving (lifting) patient, avoid all strains on joints by lifting evenly. In bed, support all parts, using pillows or sandbags.

## NOTES

## Treatment Trays

### *Hypodermic Tray*

1. Alcohol lamp and tablespoon attached.
2. Beaker, 250 cc., with sterile 4- by 4-inch sponge in bottom.
3. Sponge bowls, glass, 2 (for clean and waste cotton).
4. Syringes 2 cc. 2.
5. Needles, hypodermic,  $\frac{3}{4}$  inch, 23 gauge, 4.
6. Tissue forceps, plain.
7. File for ampules, 2.
8. Stimulants and other drugs as ordered.
9. Alcohol 70 percent for syringe beaker.
10. Cotton squares (2- by 2-inch) sponges for breaking ampules.

NOTE: For intramuscular injection 5 cc. syringe. Needles 2 inch, 21 and 18 gauge.

### *Catheterization Tray*

1. Enamel tray with lid, for catheters.
2. Rubber catheters, numbers 16, 18, and 20.
3. Tissue forceps, plain.
4. Towels (field) 2 or spinal sheet.
5. Cotton balls, 6.
6. Emesis basins, 2.
7. Specimen container.
8. Container for lubrication.
9. Solution bowls, 2.

Accessories: Lubricating jelly, sterile. Sterile gloves.

### *Surgical Preparation (Sterile)*

1. Solution basins, 3.
2. Large dressings, 12.
3. 4- by 4-inch gauze sponges 6, cotton balls or applicators 6.
4. Field towel or large covers, 4.
5. Gauze bandage 2 inch and 3 inch, 1 each.
6. Abdominal binder.
7. Solutions: Green soap, sterile water, 70 percent alcohol or disinfectant as ordered, ether.
8. Emesis basin.

Accessories: Straight razor, adhesive, and safety pins.

### *Ether Table*

1. Cans of ether, unopened, 5.
2. Mask with gauze or stockinette cover (8 thicknesses of gauze).
3. Field towels 4 (2 folded lengthwise 4 times).
4. Gauze eye protector with rubber or wax paper cover.
5. Oral screw with tongue depressor mouth gag.
6. Tongue grasping forceps.

7. Sponge holding forceps.
8. 4- by 4-inch gauze sponges.
9. Bandage scissors, gauze wick, two-grooved cork (one groove on each side and one slightly deeper than the other).
10. 30 cc. syringe with number 18 catheter attached, for suction if necessary.
11. Suction machine at hand, if available.
12. Metal airway with  $\frac{1}{2}$  inch by 12 inch tape or 1 inch by 12 inch bandage and safety pin attached.
13. Equipment for oxygen administration at hand, if possible.
14. Castor oil or mineral oil and medicine dropper.

### ***Instrument Tray***

1. Bark-Parker knives (handles number 3 and 4, with assorted blades).
2. Scissors, Mayo's dissecting, straight and curved, 2 each.
3. Scissors, suture removing, one point sharp.
4. Forceps, Michel's, clip applying and removing.
5. Forceps, hemostatic, Kelly's straight and curved, 3 each.
6. Forceps, hemostatic, Pean's curved, 3.
7. Probe and groove directors, 6 inch and 10 inch.
8. Forceps, tissue, plain and mouse tooth, 2 each.
9. Skin clips.
10. Medicine glasses, 4.
11. Retractors, hook, 2.
12. Applicators, 4- by 4-inch sponges, field towels.

### ***Emergency Suture Tray***

1. Towels 2, 4- by 4-inch sponges, 12, applicators 6.
2. Suture basin, with assorted suture material. Plain catgut numbers 00, 0, and 1; chromic numbers 0, 1; black silk number 0; or cotton thread, number 30.
3. Instruments: Ligature carrier; Needle holder 2; Mosquito forceps 3; Kelly hemostats 3 curved, 3 straight; Scissors, Mayo's straight or curved, 2; Scissors, suture, one point sharp; Forceps, tissue, plain 2, mouse tooth 2; Bard-Parker knife number 3 handle, number 10 blade, 2.
4. Needles, surgeon's suture, cutting edge and round, curved, assorted.
5. Needles, cutting edge, straight 3.
6. Medicine glass 2, syringe 2 cc. and 5 cc.
7. Needles, hypodermic 1 2 inch, 22 gauge, 1  $1\frac{3}{4}$  inch, 23 gauge, 1  $1\frac{1}{2}$  inch, 21 gauge.

### ***Sodium Pentothal Anesthesia Tray***

1. Ampule of Sodium Pentothal 2, file.
2. Ampule of sterile distilled water 2.
3. Syringe 20 cc., 2.
4. Needles  $1\frac{1}{4}$  inch, 20 and 21 gauge 3 (2 number 20).
5. Skin preparation solution, applicators, 4- by 4-inch sponges.
6. Number 14 catheter tubing (closed end cut off).

7. Two-way stopcock adapter.
8. Cotton butterfly.

### ***Retention Enema***

1. Small glass funnel with number 16 or number 18 catheter attached.
2. 125 cc. graduate.
3. Small pitcher containing medication or other liquid as ordered.
4. Small solution bowl to keep liquid in pitcher warm.
5. Vaseline on toilet paper.
6. Emesis basin.
7. Rubber treatment sheet with cover.
8. Small abdominal pad.
9. Toilet paper.

### ***Proctoclysis***

1. Irrigating can or Kelly infusion bottle, 250 cc., with.
2. Rubber tubing,  $\frac{1}{4}$ - by 12-inch and  $\frac{1}{4}$ - by 36-inch.
3. Murphy drip, Hoffman or Baxter clamp.
4. Glass connection tube.
5. Rubber catheter number 20.
6. Y glass tube with rubber tubing  $\frac{1}{4}$ - by 36-inch, if equipment is needed for "back-flow" escape of gas.
7. Treatment rubber with cover towel (small rubber sheet).
8. Large abdominal pad.
9. Vaseline on toilet paper.
10. Adhesive strip,  $\frac{1}{4}$ - by 18-inch.
11. Emesis basin.

### ***Gavage***

1. Number 16 or 18 catheter attached to small glass funnel.
2. Solution basin (small) with cracked ice for catheter.
3. Medicine glass with mineral oil.
4. Small pitcher with liquid nourishment.
5. Small basin of hot water to keep nourishment pitcher warm.
6. 125 cc. glass graduate.
7. Emesis basins, 2.
8. 4- by 4-inch gauze sponges, 12.
9. Treatment rubber sheet with cover towel.
10. Safety pin.

NOTE: Use Levine tube instead of catheter if tube must pass beyond esophageal stricture.

Blank lined paper.

## NOTES

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## APPENDIX

### Materia Medica

The substances used in the science and art of healing are called *materia medica*—medical material. These substances generally are spoken of as medicines, the study of which includes their sources, composition, physical characteristics, chemical properties, preparation, uses, and their physiological and toxicological action.

*Therapeutics* is concerned with the properties of medicinal substances and the application of remedial agents in the treatment of disease. In addition to medicines used, it is proper to include the use of electricity, water, serums, vaccines, light rays, heat, physical, mechanical and operative measures and hygienic agents as curative or remedial means.

Therapeutics is divided into three classes:

1. *Rational*—based upon known laws of the remedies and the diseases;
2. *Empirical*—based entirely on the results of clinical observation and experience; and
3. *General*—when remedial agents other than drugs or medicines are used.

Medicines may be divided into two general groups:

1. *Stimulants*, which increase the functional activity of the body or of any organ or tissue; and
2. *Sedatives*, which lessen or reduce functional activity.

Medicines are described and classified according to their actions or effects. Following is a list of some of the terms used:

*Alteratives*—Medicines which change the course of diseased conditions of the body by promoting metabolism.

*Analgesics* or *Anodynes*—Medicines which relieve pain, either by direct depression on the centers of perception and sensation in the cerebrum, or by impairing the conductivity of the sensory nerve fibers. They do not necessarily produce unconsciousness.

*Anaesthetics*—Agents which temporarily destroy sensation locally or generally.

*Anthelmintics*—Agents which destroy or expel worms from the intestinal tract.

*Anti-emetics*—Medicines which diminish or stop vomiting.

*Antiperiodics*—Medicines which affect certain periodic febrile diseases, lessening the severity of their paroxysms, or preventing their return.

*Antipyretics*—Medicines or measures used to reduce body temperature, when abnormally high.

**Antiseptics**—Agents which arrest the development of the microorganisms which produce decomposition.

**Antispasmodics**—Medicines which prevent or allay spasms of voluntary or involuntary muscles in any part of the body.

**Antisudorifics** or **Anhidrotics**—Agents which check perspiration.

**Aphrodisiacs**—Medicines which stimulate sexual appetite and power.

**Aromatics**—Medicines which stimulate the gastro-intestinal mucous membrane.

**Astringents**—Medicines which produce contraction of muscular fiber; lessen secretions from mucous membranes.

**Bacteriostatics**—Medicines or agents which prevent or arrest the growth of bacteria.

**Cardiac Sedatives** or **Depressants**—Medicines or agents which lessen the force and the frequency of the heart's action.

**Cardiac Stimulants** or **Excitants**—Medicines which increase the force and frequency of the pulse in depressed conditions of the heart.

**Carminatives**—Medicines which promote expulsion of gas from the stomach and intestines by increasing peristalsis, stimulating circulation and relaxing the pyloric and cardiac orifices of the stomach.

**Cathartics**—Medicines which increase or hasten intestinal evacuation. Cathartics are divided into several classes, according to the degree and direction of action:

1. **Laxatives** or **Aperients**—Medicines which excite moderate peristalsis and produce softened movements without irritation.

2. **Simple Purgatives**—Medicines which cause active peristalsis and stimulate the secretions of the intestinal glands, producing one or more copious and semi-fluid movements with some irritation and griping.

3. **Drastic Purgatives**—Medicines which produce violent peristalsis and watery stools with much griping pain and tenesmus (straining at stool with gas); they irritate the intestinal mucous membranes, and cause exosmosis of the serum from the vessels.

4. **Saline Purgatives**—Medicines which stimulate the intestinal glands to increase secretions, causing an accumulation of fluid in the intestinal tract, which partly from the effect of gravity and partly from the gentle stimulation of peristalsis excited by distension, reach the rectum and produce copious evacuation.

5. **Hydrogogue Purgatives**—Medicines which produce very drastic removal of large quantities of water from the vessels.

6. **Cholagogue Purgatives**—Medicines which produce free green-colored stools.

**Cerebral Depressants**—Medicines which lower or suspend the functions of the cerebrum after a preliminary stage of excitement.

**Cerebral Stimulants**—Medicines which increase the functional activity of the brain without producing any subsequent depression or suspension of the cerebral functions.

**Ciliary Excitants**—Medicines which when dissolved in the mouth, promote the expectoration of bronchial mucus, either by reflex action of the trachea or bronchial cillum.

**Delirients**—Medicines which excite the functions of the cerebral cortex to such a degree as to disorder the mental functions and produce mental confusion, loss of will power, delirium and even convulsions.

**Demulcents**—Substances usually of oleaginous or mucilaginous nature which soothe and protect the parts to which they are applied. When they are used for the mucous membrane, the term "demulcent" is used; when used on the skin, the term "emollient" is used.

**Deodorants**—Substances which destroy foul odors.

**Diaphoretics or Sudorifics**—Medicines which increase the action of the skin and promote the secretion of sweat.

**Discutients, Sorbifacients or Resolvents**—Medicines or agents which stimulate the lymphatics by promoting absorption of nutritive or medicinal material into the system, acting somewhat like alteratives.

**Diuretics**—Medicines which promote the secretion of urine either by raising the local or general blood pressure and so increasing the circulation of the kidneys, by stimulating the secreting cells or nerves of the kidneys or by flushing the kidneys with water.

**Emetics**—Medicines which promote vomiting.

**Emmenagogues**—Medicines which restore the menstrual function, either directly by stimulation of the uterine muscular fibers, or indirectly by improving the blood and toning up the nervous system.

**Errhines**—Agents or medicines which produce increased nasal secretions without sneezing.

**Escharotics or Caustics**—Medicines or agents which destroy the tissue to which applied and produce a slough.

**Expectorants**—Medicines which modify the secretion of the bronchopulmonary mucous membranes and promote its expulsion.

**Hemostatics**—Medicines, taken internally, which stop bleeding.

**Hepatic Depressants**—Medicines which lower the functional activity of the liver.

**Hepatic Stimulants and Cholagogues**—Medicines which act upon the secretion of bile. Hepatic stimulants increase the functional activity of the liver cells and the amount of bile formed. Cholagogues remove bile from the duodenum, and prevent its reabsorption into the portal circulation.

**Hypnotics**—Medicines which produce sleep. In a broad sense the term includes the narcotics and general anaesthetics, but it is usually restricted to those mediums which, in doses necessary to cause sleep, do not disturb the normal relationship of the mental faculties to the external world.

**Intestinal Astringents**—Medicines which contract the walls of the intestinal vessels, diminishing their exudation and lessening the fluidity of the fecal discharges.

**Irritants**—Agents which, when applied to the skin, produce a greater or lesser degree of vascular excitement.

**Myotics**—Medicines which cause the contraction of the pupil of the eye.

**Motor Depressants**—Medicines which lower the functional activity of the spinal cord and motor apparatus, or which in large doses paralyze them completely.

**Motor Excitants**—Medicines which increase the functional activity of the spinal cord and motor apparatus, producing increased reflex excitability, disturbance of motility and tetanic convulsions when given in large doses.

**Mydriatics**—Medicines which cause dilation of the pupil of the eye. Most mydriatics produce paralysis of the ciliary muscles.

**Narcotics**—Medicines which lessen the relationship of the individual to the external world. At first they act as excitants to the higher brain, and a stimulant to the mind and all bodily functions. The next stage in their action is one of profound sleep, characterized by increasing stupor, followed by coma and insensibility, if the dose has been sufficient. Death occurs from paralysis of the medullary centers, which govern respiration and the other functions of organic life.

**Oxytocics** or **Ecbolics**—Medicines which stimulate the muscular fibers of the uterus to contractions and may therefore produce abortion.

**Parasiticides**—Agents which destroy animal and vegetable parasites found upon the human body.

**Pulmonary Sedatives**—Medicines which diminish cough and dyspnea by lessening the irritation of the respiration center or the nerves of respiration.

**Pustulants**—Medicines which affect the orifices of the sweat glands, causing pustules.

**Refrigerants**—Substances which allay thirst and impart a feeling of coolness.

**Renal Depressants**—Medicines which lower the activity of the kidneys and thus lessen or suspend the urinary secretions.

**Respiratory Depressants**—Medicines which lower the activity of the respiratory center, rendering the respirations slow and shallow.

**Respiratory Stimulants**—Medicines which stimulate the functions of the respiratory centers, by quickening the deepening breathing.

**Restoratives**—Medicines which promote constructive changes, including hematinics and tonics. Hematinics are medicines which increase the quantity of hematin in the blood and thus restore the quality of the blood by enriching its red corpuscles. Tonics are medicines which improve the tone of the tissues on which they have specific action.

**Rubefacients**—Agents which produce temporary redness and congestion of the skin.

**Sedatives**—Medicines or agents which exert a soothing influence on the body by lessening functional activity, depressing motility and diminishing pain.

**Sialogogues**—Medicines or agents which increase the secretion and flow of saliva and buccal mucous.

**Specifics**—Medicines which have a selective, curative influence on a particular disease.

**Sternutatories**—Agents or medicines which produce increased nasal secretions accompanied by sneezing.

**Stimulants**—Agents which excite, even briefly, the organic action of any part of the body.

**Stomachics**—Medicines which increase the appetite and promote gastric digestion.

**Styptics**—Medicines or agents which stop bleeding when applied locally.

**Synergists**—Medicines which cooperate in their action, increasing the efficacy of the medicine with which used.

**Urinary Acidifiers**—Medicines which render the urine acid in reaction.

**Urinary Alkalinizers**—Medicines which render the urine alkaline in reaction.

*Urinary Sedatives and Astringents*—Medicines which when taken internally, act as a sedative upon the whole extent of the urinary tract, through the medium of the urine, which when charged with the medicines, brings them in contact with the genito-urinary mucous membranes.

*Uterine Depressants*—Medicines which lower the activity of the nerve muscle apparatus, which controls uterine contractions.

*Vasoconstrictors*—Medicines which increase the contractile power of the vessels, lessening the circulation in the vessels and raising the blood pressure.

*Vasodilators*—Medicines which produce dilation of the peripheral blood vessels and increase the rapidity of the circulation, thus equalizing the blood pressure and relieving internal congestion.

*Vesical Sedatives*—Medicines which lessen irritability of the bladder, relieving pain and decreasing the desire to urinate, and lessen the irritability of nerves.

*Vesical Tonics*—Medicines which increase the contractile power of the muscular fibers of the walls of the bladder, by strengthening the longitudinal muscle fibers in the bladder.

*Vesicants*—Medicines or agents which cause decided inflammation of the skin and the outpouring of serum between the two layers of the skin.

## NOTES

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## DOSAGE TABLE

The drugs listed in this table are those which have been officially recognized in the current editions of the U. S. Pharmacopoeia and the National Formulary. Those printed in black face are U. S. P. drugs; the others are official in the N. F. The action or use listed for each drug is the usual or most important one as generally included in most standard texts.

English name and Latin title	Metric dose	Apothecary dose	Action or use
<b>ACACIA MUCILAGE</b> ..... <i>Mucilago Acaciae.</i>	15 cc. ....	$\frac{1}{3}$ iv.....	Demulcent.
<b>ACETANILID</b> ..... <i>Acetanilidum.</i>	0.2 Gm. ....	grs. iii.....	Analgesic; Antipyretic.
<b>ACETANILID POWDER, COMPOUND</b> ..... <i>Pulvis Acetanilidi Compositus.</i>	0.3 Gm. ....	grs. v.....	Analgesic; Antipyretic.
<b>ACETANILID TABLETS</b> ..... <i>Tabellae Acetanilidi</i>	0.2 Gm. ....	grs. iii.....	Analgesic; Antipyretic.
<b>ACETARSONE</b> ..... <i>Acetarsonum.</i>	0.25 Gm. ....	grs. iv.....	Amebicide.
<b>ACETIC ACID, DILUTED</b> ..... <i>Acidum Aceticum Dilutum.</i>	2 cc. ....	$\mathfrak{M}$ xxx.....	Astringent; Counter-irritant.
<b>ACETOPHENETIDIN</b> ..... <i>Acetophenetidinum.</i>	0.3 Gm. ....	grs. v.....	Analgesic; Antipyretic.
<b>ACETOPHENETIDIN TABLETS</b> ..... <i>Tabellae Acetophenetidini.</i>	0.3 Gm. ....	grs. v.....	Analgesic; Antipyretic.
<b>ACETOPHENETIDIN AND PHENYL SALICYLATE TABLETS</b> ..... <i>Tabellae Acetophenetidini et Phenylis Salicylatis.</i>	0.15 Gm. ....	grs. liss.....	Antirheumatic; Antipyretic.
<b>ACETYSALICYLIC ACID</b> ..... <i>Acidum Acetylsalicylicum</i>	0.3 Gm. ....	grs. v.....	Analgesic; Antipyretic.
<b>ACETYSALICYLIC ACID TABLETS</b> ..... <i>Tabellae Acidi Acetylsalicylici.</i>	0.3 Gm. ....	grs. v.....	Analgesic; Antipyretic.
<b>ACONITE (Monkshood)</b> ..... <i>Aconitum.</i>	0.06 Gm. ....	grs. i.....	Cardiac sedative.
<b>ACONITE FLUIDEXTRACT</b> ..... <i>Fluidextractum Aconiti.</i>	0.06 cc. ....	$\mathfrak{M}$ i.....	Cardiac sedative.
<b>ACONITE TINCTURE</b> ..... <i>Tinctura Aconiti.</i>	0.6 cc. ....	$\mathfrak{M}$ x.....	Cardiac sedative.
<b>AGAR</b> ..... <i>Agar.</i>	4 Gm. ....	$\mathfrak{Z}$ i.....	Demulcent; Cathartic.
<b>ALOE AND MASTIC PILLS</b> ..... <i>Pilulae Aloes et Mastiches (Lady Webster Dinner Pills).</i>	2 pills <sup>1</sup> .....	.....	Cathartic.
<b>ALOE PILLS</b> ..... <i>Pilulae Aloes.</i>	2 pills <sup>2</sup> .....	.....	Cathartic.
<b>ALOIN</b> ..... <i>Aloinum.</i>	0.015 Gm. ....	gr. $\frac{1}{4}$ .....	Cathartic.
<b>ALOIN, BELLADONNA, CASCARA AND PODOPHYLLUM PILLS</b> ..... <i>Pilulae Aloini Belladonnae Cascarae et Podophylli.</i>	1 pill <sup>3</sup> .....	.....	Cathartic.
<b>ALOIN, STRYCHNINE AND BELLADONNA PILLS</b> ..... <i>Pilulae Aloini Strychnini et Belladonnae.</i>	1 pill <sup>4</sup> .....	.....	Cathartic.

<sup>1</sup> Aloe—0.26 Gm.; Mastic—0.08 Gm.

<sup>2</sup> Aloe—0.26 gr.

<sup>3</sup> Aloin—0.016 Gm.; Belladonna Extract—0.008 Gm.; Cascara Sagrada Extract—0.016 Gm.; Podophyllum Resin—0.01 Gm.; Ginger Oleoresin—0.004 Gm.

<sup>4</sup> Aloin—0.013 Gm.; Strychnine—0.001 Gm.; Belladonna Extract—0.008 Gm.

English name and Latin title	Metric dose	Apothecary dose	Action or use
ALOIN, STRYCHNINE, BELLADONNA AND IPECAC PILLS. <i>Pilulae Aloini Strychnini Belladonnae et Ipecacuanhae.</i>	1 pill <sup>5</sup>	-----	Cathartic.
ALUMINUM HYDROXIDE GEL..... <i>Gelatum Alumini Hydroxidi.</i>	8 cc.-----	f℥ ii-----	Mild astringent; Desiccant.
ALUMINUM HYDROXIDE GEL, DRIED. <i>Gelatum Alumini Hydroxidi Siccum.</i>	0.6 Gm.-----	grs. x-----	Mild astringent; Desiccant.
ALUMINUM PHOSPHATE GEL..... <i>Gelatum Alumini Phosphatis.</i>	8 cc.-----	f℥ ii-----	Mild astringent.
AMINOACETIC ACID..... <i>Acidum Aminoaceticum.</i>	30 Gm.-----	℥ viii-----	Muscular stimulant.
AMINOACETIC ACID ELIXIR..... <i>Elixir Acidi Aminoacetici.</i>	15 cc.-----	f℥ iv-----	Muscular stimulant.
AMINOPHYLLINE..... <i>Aminophyllina.</i>	0.2 Gm.-----	grs. iiii-----	Diuretic.
AMINOPHYLLINE INJECTION..... <i>Injectio Aminophyllinae.</i>	0.25 Gm.-----	grs. iv-----	Diuretic.
AMINOPHYLLINE TABLETS..... <i>Tabellae Aminophyllinae.</i>	0.2 Gm.-----	grs. iiii-----	Diuretic.
AMINOPYRINE..... <i>Aminopyrina.</i>	0.3 Gm.-----	grs. v-----	Analgesic; Antipyretic.
AMINOPYRINE ELIXIR..... <i>Elixir Aminopyrinae.</i>	4 cc. <sup>6</sup> -----	f℥ i-----	Analgesic; Antipyretic.
AMINOPYRINE TABLETS..... <i>Tabellae Aminopyrinae.</i>	0.3 Gm.-----	grs. v-----	Analgesic; Antipyretic.
AMMONIA SPIRIT, ANISATED..... <i>Spiritus Ammoniae Anisatus.</i>	1 cc.-----	℥ xv-----	Aromatic carminative.
AMMONIA SPIRIT, AROMATIC..... <i>Spiritus Ammoniae Aromaticus.</i>	2 cc.-----	℥ xxx-----	Circulatory restorative
AMMONIUM CARBONATE..... <i>Ammonii Carbonas.</i>	0.3 Gm.-----	grs. v-----	Expectorant.
AMMONIUM BROMIDE..... <i>Ammonii Bromidum.</i>	1 Gm.-----	grs. xv-----	Nerve sedative.
AMMONIUM BROMIDE ELIXIR..... <i>Elixir Ammonii Bromidi.</i>	4 cc.-----	f℥ i-----	Nerve sedative.
AMMONIUM CHLORIDE..... <i>Ammonii Chloridum.</i>	0.3 Gm.-----	grs. v-----	Expectorant.
AMMONIUM CHLORIDE CAPSULES..... <i>Capsulae Ammonii Chloridi.</i>	4 Gm.-----	grs. Lx-----	Diuretic.
AMMONIUM CHLORIDE TABLETS..... <i>Tabellae Ammonii Chloridi.</i>	0.3 Gm.-----	grs. v-----	Expectorant.
AMMONIUM IODIDE..... <i>Ammonii Iodidum.</i>	0.3 Gm.-----	grs. v-----	Alterative.
AMMONIUM VALERATE, ACID..... <i>Ammonii Valeras Acidus.</i>	0.125 Gm.-----	grs. ii-----	Nerve Sedative.
AMMONIUM SALICYLATE..... <i>Ammonii Salicylas.</i>	1 Gm.-----	grs. xv-----	Antirheumatic.
AMMONIUM VALERATE ELIXIR..... <i>Elixir Ammonii Valeratis.</i>	4 cc.-----	f℥ i-----	Nerve sedative.
AMYL NITRITE..... <i>Amylis Nitris.</i>	2 cc.-----	℥ iiii-----	(Inhalation) vasodilator.
ANETHOLE..... <i>Anethole.</i>	0.1 cc.-----	℥ iss-----	Aromatic carminative.
ANHYDROHYDROXYPROGESTERONE..... <i>Anhydrohydroxyprogesteronum.</i>	0.01 Gm.-----	gr. ¼-----	Antibabortients.
ANHYDROHYDROXYPROGESTERONE TABLETS..... <i>Tabellae Anhydrohydroxyprogesteroni.</i>	0.01 Gm.-----	gr. ¼-----	Antibabortients.
ANISE SPIRIT..... <i>Spiritus Anisi.</i>	1 cc.-----	℥ xv-----	Aromatic carminative.
ANTIMONY POTASSIUM TARTRATE..... <i>Antimonii Potassii Tartras.</i>	0.003 Gm.-----	gr. ½o-----	Expectorant; Emetic.

<sup>5</sup> Aloin—0.016 Gm.; Strychnine—0.001 Gm.; Belladonna Extract—0.008 Gm.; Ipecac—0.004 Gm.

<sup>6</sup> Aminopyrine—0.16 Gm.

English name and Latin title	Metric dose	Apothecary dose	Action or use
<b>ANTIMONY SODIUM THIOGLYCOLLATE.</b> <i>Antimonii Sodii Thioglycollas.</i>	0.05 Gm.	gr. $\frac{3}{4}$	Expectorant; Emetic.
<b>ANTIMONY SODIUM THIOGLYCOLLATE INJECTION.</b> <i>Injectio Antimonii Sodii Thioglycollatis.</i>	0.05 Gm.	gr. $\frac{3}{4}$	Expectorant; Emetic.
<b>ANTIPYRINE.</b> <i>Antipyrina.</i>	0.3 Gm.	grs. v	Antipyretic; Analgesic.
<b>APOCYNUM.</b> <i>Apocynum.</i>	0.06 Gm.	grs. i	Cardiac tonic.
<b>APOMORPHINE HYDROCHLORIDE.</b> <i>Apomorphinae Hydrochloridum.</i>	0.005 Gm.	gr. $\frac{1}{2}$	Emetic.
<b>APOMORPHINE HYDROCHLORIDE TABLETS.</b> <i>Tabellae Apomorphinae Hydrochloridi.</i>	0.005 Gm.	gr. $\frac{1}{2}$	Emetic.
<b>ARALIA.</b> <i>Aralia.</i>	2 Gm.	grs. xxx	Alterative; diuretic.
<b>ARNICA FLUIDEXTRACT.</b> <i>Fluidextractum Arnicae.</i>	0.1 cc.	℥ iss.	Counterirritant.
<b>ARNICA TINCTURE.</b> <i>Tinctura Arnicae.</i>	0.5 cc.	℥ viii.	Counterirritant.
<b>AROMATIC POWDER.</b> <i>Pulvis Aromaticus.</i>	1 Gm.	grs. xv	Carminative.
<b>ARSENIC AND MERCURIC IODIDES SOLUTION.</b> <i>Liquor Arseni et Hydrargyri Iodidorum.</i>	0.1 cc.	℥ iss.	Antiluetic; Alterative.
<b>ARSENIC TRIIODIDE.</b> <i>Arseni Triiodidum.</i>	0.005 Gm.	gr. $\frac{1}{2}$	Antiperiodic; Alterative.
<b>ARSENIC TRIOXIDE TABLETS.</b> <i>Tabellae Arseni Trioxidi.</i>	0.002 Gm.	gr. $\frac{1}{60}$	Antiperiodic; Alterative.
<b>ARSENIOUS ACID SOLUTION.</b> <i>Liquor Acidi Arseniosi.</i>	0.2 cc.	℥ iii.	Antiperiodic; Alterative.
<b>ARSPHENAMINE.</b> <i>Arspenamina.</i>	0.3 Gm.	grs. v	Antisypheletic.
<b>ASALETIDA.</b> <i>Asafoetida.</i>	0.4 Gm.	grs. vi	Carminative; Nervine.
<b>ASALETIDA PILLS.</b> <i>Pilulae Asafoetidae.</i>	1 pill <sup>7</sup>		Carminative; Nervine.
<b>ASALETIDA TINCTURE.</b> <i>Tinctura Asafoetidae.</i>	1 cc.	℥ xv	Carminative; Nervine.
<b>ASPIDIUM OLEORESIN.</b> <i>Oleoresina Aspidii.</i>	4 Gm.	grs. Lx	Teniacide.
<b>ATROPINE.</b> <i>Atropina.</i>	0.4 mg.	gr. $\frac{1}{60}$	Antispasmodic; Anhidrotic.
<b>ATROPINE SULFATE.</b> <i>Atropinae Sulfas.</i>	0.5 mg.	gr. $\frac{1}{20}$	Antispasmodic; Anhidrotic.
<b>ATROPINE SULFATE TABLETS.</b> <i>Tabellae Atropinae Sulfatis.</i>	0.5 mg.	gr. $\frac{1}{20}$	Antispasmodic; Anhidrotic.
<b>BARBITAL.</b> <i>Barbitalum.</i>	0.3 Gm.	grs. v	Hypnotic; sedative.
<b>BARBITAL ELIXIR.</b> <i>Elixir Barbitali.</i>	4 cc.	f3 i.	Hypnotic; Sedative.
<b>BARBITAL TABLETS.</b> <i>Tabellae Barbitali.</i>	0.3 Gm.	grs. v	Hypnotic; Sedative.
<b>BARBITAL SODIUM.</b> <i>Barbitalum Sodium.</i>	0.3 Gm.	grs. v	Hypnotic; Sedative.
<b>BARBITAL SODIUM TABLETS.</b> <i>Tabellae Barbitali Sodici.</i>	0.3 Gm.	grs. v	Hypnotic; Sedative.
<b>BEEF, IRON AND WINE.</b> <i>Caro, Ferrum et Vinum.</i>	8 cc.	f3 ii.	Stimulant; Flavor.
<b>BELLADONNA EXTRACT.</b> <i>Extractum Belladonnae.</i>	15 mg.	gr. $\frac{1}{4}$	Antispasmodic; Anhidrotic.
<b>BELLADONNA LEAF FLUIDEXTRACT.</b> <i>Fluidextractum Belladonnae Folii.</i>	0.06 cc.	℥ i.	Antispasmodic; Anhidrotic.
<b>BELLADONNA TINCTURE.</b> <i>Tinctura Belladonnae.</i>	0.6 cc.	℥ x.	Antispasmodic; Anhidrotic.
<b>BELLADONNA ROOT FLUIDEXTRACT.</b> <i>Fluidextractum Belladonnae Radicis.</i>	0.05 cc.	℥ $\frac{3}{4}$	Antispasmodic; Anhidrotic.

<sup>7</sup> Asaletida—0.4 Gm.

English name and Latin title	Metric dose	Apothecary dose	Action or use
BENZALDEHYDE. <i>Benzaldehydum.</i>	0.03 cc.	℥ ss.	Flavor.
BENZALDEHYDE SPIRIT. <i>Spiritus Benzaldehydi.</i>	0.5 cc.	℥ viii.	Flavor.
BETANAPHTHOL. <i>Betanaphthol.</i>	0.12 Gm.	grs. ii.	Antiseptic; Parasiticide.
BISMUTH MAGMA. <i>Magma Bismuthi.</i>	4 cc.	f℥ i.	Soothing; Astringent.
BISMUTH POTASSIUM TARTRATE. <i>Bismuthi Potassii Tartras.</i>	0.1 Gm.	grs. iss.	Antispychilic; Diuretic.
BISMUTH SUBCARBONATE. <i>Bismuthi Subcarbonas.</i>	1 Gm.	grs. xv.	Soothing; Astringent.
BISMUTH SUBCARBONATE TABLETS. <i>Tabellae Bismuthi Subcarbonatis.</i>	1 Gm.	grs. xv.	Soothing; Astringent.
BISMUTH SUBGALLATE. <i>Bismuthi Subgallas.</i>	1 Gm.	grs. xv.	Antiseptic; Astringent.
BISMUTH SUBGALLATE TABLETS. <i>Tabellae Bismuthi Subgallatis.</i>	1 Gm.	grs. xv.	Antiseptic; Astringent.
BISMUTH SUBNITRATE. <i>Bismuthi Subnitratis.</i>	1 Gm.	grs. xv.	Protective; Astringent.
BISMUTH SUBNITRATE TABLETS. <i>Tabellae Bismuthi Subnitratis.</i>	1 Gm.	grs. xv.	Protective; Astringent.
BISMUTH SUBSALICYLATE. <i>Bismuthi Subsalcylas.</i>	1 Gm.	grs. xv.	Antiseptic; Astringent.
BISMUTH SUBSALICYLATE INJECTION. <i>Injectio Bismuthi Subsalcylatis.</i>	0.1 Gm.	grs. iss.	Antiseptic; Astringent.
BROMIDES, FIVE, ELIXIR. <i>Elixir Bromidorum Quinque.</i>	4 cc.	f℥ i.	Nerve sedative
BROMIDES SYRUP. <i>Syrupus Bromidorum.</i>	4 cc.	f℥ i.	Nerve sedative
BROMIDES, THREE, ELIXIR. <i>Elixir Bromidorum Trium.</i>	4 cc.	f℥ i.	Nerve sedative
BROMIDES, THREE, TABLETS. <i>Tabellae Bromidorum Trium.</i>	0.3 Gm.	grs. v.	Nerve sedative
BRUCINE SULFATE. <i>Brucinae Sulfas.</i>	2 mg.	gr. 1/3p0.	Simple bitter
BRYONIA. <i>Bryonia.</i>	1 Gm.	grs. xv.	Cathartic
BUCHU. <i>Buchu.</i>	2 Gm.	grs. xxx.	Diuretic
BUCHU FLUIDEXTRACT. <i>Fluidextractum Buchu.</i>	2 cc.	℥ xxx.	Diuretic
BUCHU, JUNIPER AND POTASSIUM ACETATE ELIXIR. <i>Elixir Buchu Juniperi et Potassii Acetatis.</i>	4 cc. <sup>8</sup>	f℥ i.	Diuretic
CAFFEINE. <i>Caffeina.</i>	0.2 Gm.	grs. lii.	Diuretic; Stimulant
CAFFEINE and SODIUM BENZOATE. <i>Caffeina et Sodii Benzoas.</i>	0.5 Gm.	grs. viiss.	Stimulant
CAFFEINE and SODIUM BENZOATE INJECTION. <i>Injectio Caffeinae et Sodii Benzoastis.</i>	0.5 Gm.	grs. viiss.	Stimulant.
CAFFEINE AND SODIUM BENZOATE TABLETS. <i>Tabellae Caffeinae et Sodii Benzoatis.</i>	0.5 Gm.	grs. viiss.	Stimulant.
CAFFEINE, CITRATED. <i>Caffeina Citrata.</i>	0.3 Gm.	grs. v.	Diuretic; Stimulant.
CAFFEINE AND SODIUM SALICYLATE. <i>Caffeina et Sodii Salicylas.</i>	0.2 Gm.	grs. lii.	Diuretic; Stimulant.
CAFFEINE, CITRATED, TABLETS. <i>Tabellae Caffeinae Citratae.</i>	0.3 Gm.	grs. v.	Diuretic; Stimulant.
CALCIUM CARBONATE, PRECIPITATED. <i>Calcii Carbonas Precipitatus.</i>	1 Gm.	grs. xv.	Antacid.
CALCIUM BROMIDE. <i>Calcii Bromidum.</i>	1 Gm.	grs. xv.	Sedative.

<sup>8</sup> Buchu-0.6 Gm.; Juniper-0.3 Gm.—Potassium Acetate—0.2 Gm.

English name and Latin title	Metric dose	Apothecary dose	Action or use
CALCIUM AND SODIUM GLYCEROPHOSPHATES ELIXIR. <i>Elixir Calcii et Sodii Glycerophosphatum.</i>	4 cc. <sup>9</sup>	f3 i.	Tonic.
CALCIUM CHLORIDE AMPULS <i>Ampullae Calcii Chloridi.</i>	1 Gm.	grs. xv.	Desiccator.
CALCIUM GLUCONATE <i>Calcii Gluconas.</i>	5 Gm.	grs. Lxxv.	Desiccator.
CALCIUM GLUCONATE INJECTION <i>Injectio Calcii Gluconatis.</i>	1 Gm.	grs. xv.	Desiccator.
CALCIUM GLUCONATE TABLETS <i>Tabellae Calcii Gluconatis.</i>	5 Gm.	grs. xv.	Desiccator.
CALCIUM GLYCEROPHOSPHATE <i>Calcii Glycerophosphas.</i>	0.3 Gm.	grs. v.	Tonic.
CALCIUM HYPOPHOSPHITE <i>Calcii Hypophosphis.</i>	0.5 Gm.	grs. viiss.	Antiarchitic; Tonic.
CALCIUM IODOBEHENATE <i>Calcii Iodobehenas.</i>	0.5 Gm.	grs. viiss.	Alterative.
CALCIUM LACTATE <i>Calcii Lactas.</i>	0.5 Gm.	grs. viiss.	Desiccator.
CALCIUM LACTATE TABLETS <i>Tabellae Calcii Lactatis.</i>	1 Gm.	grs. xv.	Desiccator.
CALCIUM LEVULINATE <i>Calcii Levulinas.</i>	1 Gm.	grs. xv.	Desiccator.
CALCIUM LEVULINATE AMPULS <i>Ampullae Calcii Levulinatis.</i>	1 Gm.	grs. xv.	Desiccator.
CALCIUM MANDELATE <i>Calcii Mandelas.</i>	4 Gm.	grs. Lx.	Urinary antiseptic.
CALCIUM PHOSPHATE, DIBASIC <i>Calcii Phosphas Dibasicus.</i>	1 Gm.	grs. xv.	Antacid; Hemostatic.
CALCIUM PHOSPHATE, TRIBASIC <i>Calcii Phosphas Tribasicus.</i>	1 Gm.	grs. xv.	Antacid.
CALUMBA <i>Calumba.</i>	1 Gm.	grs. xv.	Stomachic.
CAMPHOR <i>Camphora.</i>	0.2 Gm.	grs. iii.	Stimulant; Carminative.
CAMPHOR AMPULS <i>Ampullae Camphorae.</i>	0.2 Gm.	grs. iii.	Stimulant; Carminative.
CAMPHOR, MONOBROMATED <i>Camphora Monobromata.</i>	0.125 Gm.	grs. ii.	Stimulant; Carminative.
CAMPHOR SPIRIT <i>Spiritus Camphorae.</i>	1 cc.	℥ xv.	Stimulant; Carminative.
CANTHARIDES TINCTURE <i>Tinctura Cantharidis.</i>	0.1 cc.	℥ iss.	Genitourinary irritant.
CAPSICUM <i>Capsicum.</i>	0.06 Gm.	gr. i.	Carminative; Stomachic.
CAPSICUM OLEORESIN <i>Oleoresina Capsici.</i>	0.015 Gm.	gr. ¼.	Carminative; Stomachic.
CAPSICUM TINCTURE <i>Tinctura Capsici.</i>	0.5 cc.	℥ viii.	Carminative; Stomachic.
CARAWAY OIL <i>Oleum Cari.</i>	0.1 cc.	℥ iss.	Carminative.
CARBACHOL <i>Carbacholum.</i>	2 mg.	gr. ½o.	Miotic; Vasodilator.
CARBACHOL INJECTION <i>Injectio Carbacholi.</i>	0.25 mg.	gr. ½so.	Miotic; Vasodilator.
CARBACHOL TABLETS <i>Tabellae Carbacholi.</i>	2 mg.	gr. ½o.	Miotic; Vasodilator.
CARBASONE <i>Carbasonium.</i>	0.2 Gm.	grs. iii.	Amebicide.
CARBASONE TABLETS <i>Tabellae Carbasoni.</i>	0.2 Gm.	grs. iii.	Amebicide.
CARBON TETRACHLORIDE <i>Carbonet Tetrachloridum.</i>	2.5 cc.	℥ xL.	Anthelmintic.
CARBON TETRACHLORIDE CAPSULES <i>Capsulae Carbonet Tetrachloridi.</i>	2.5 cc.	℥ xL.	Anthelmintic.
CARBROMAL <i>Carbromatum.</i>	0.5 Gm.	gr. viiss.	Sedative; Hypnotic.

<sup>9</sup> Calcium Glycerophosphate—0.035 Gm.; Sodium Glycerophosphate—0.07 Gm.

English name and Latin title	Metric dose	Apothecary dose	Action or use
<b>CARDAMOM TINCTURE, COMPOUND</b> ----- <i>Tinctura Cardamomii Composita.</i>	4 cc.-----	f 3 i.-----	Carminative.
<b>CARMINATIVE MIXTURE</b> ----- <i>Mistura Carminativa.</i>	0.5 cc. <sup>10</sup> -----	℥ viii.-----	Antacid.
<b>CASCARA SAGRADA EXTRACT</b> ----- <i>Extractum Cascarae Segradae.</i>	0.3 Gm.-----	grs. v.-----	Laxative.
<b>CASCARA SAGRADA EXTRACT TABLETS.</b> ----- <i>Tabellae Cascarae Segradae Extracti.</i>	0.3 Gm.-----	grs. v.-----	Laxative.
<b>CASCARA SAGRADA ELIXIR.</b> ----- <i>Elixir Cascarae Segradae.</i>	4 cc.-----	f 3 i.-----	Laxative.
<b>CASCARA SAGRADA, FLUID-EXTRACT.</b> ----- <i>Fluidextractum Cascarae Segradae.</i>	1 cc.-----	℥ xv.-----	Laxative.
<b>CASCARA SAGRADA FLUIDEXTRACT, AROMATIC.</b> ----- <i>Fluidextractum Cascarae Segradae Aromaticum.</i>	2 cc.-----	℥ xxx.-----	Laxative.
<b>CASTOR OIL.</b> ----- <i>Oleum Ricini.</i>	15 cc.-----	f 3 iv.-----	Cathartic.
<b>CASTOR OIL AROMATIC.</b> ----- <i>Oleum Ricini Aromaticum.</i>	15 cc.-----	f 3 iv.-----	Cathartic.
<b>CASTOR OIL CAPSULES.</b> ----- <i>Capsulae Olei Ricini.</i>	15 cc.-----	f 3 iv.-----	Cathartic.
<b>CATARIA.</b> ----- <i>Cataria.</i>	4 Gm.-----	grs. Lx.-----	Carminative.
<b>CATARIA AND FENNEL ELIXIR.</b> ----- <i>Elixir Catariae et Foeniculi.</i>	0.5 cc. <sup>11</sup> -----	℥ viii.-----	Carminative.
<b>CAULOPHYLLUM.</b> ----- <i>Caulophyllum.</i>	0.5 Gm.-----	grs. viiss.-----	Diuretic; Emmenagogue.
<b>CERIUM OXALATE.</b> ----- <i>Cerii Oxalas.</i>	0.2 Gm.-----	grs. lii.-----	Gastric sedative.
<b>CHALK MIXTURE.</b> ----- <i>Mistura Cretae.</i>	15 cc.-----	f 3 iv.-----	Antacid.
<b>CHALK POWDER, AROMATIC.</b> ----- <i>Pulvis Cretae Aromaticus.</i>	2 Gm.-----	grs. xxx.-----	Antacid.
<b>CHALK POWDER, COMPOUND.</b> ----- <i>Pulvis Cretae Compositus.</i>	2 Gm.-----	grs. xxx.-----	Antacid.
<b>CHALK, PREPARED.</b> ----- <i>Creta Preparata.</i>	1 Gm.-----	grs. xv.-----	Antacid.
<b>CHARCOAL, PURIFIED ANIMAL.</b> ----- <i>Carbo Animalis Purificatus.</i>	0.3 Gm.-----	grs. v.-----	Digestive adsorbent.
<b>CHAULMOOGRA OIL.</b> ----- <i>Oleum Chaulmoograe.</i>	1 cc.-----	℥ xv.-----	Leper therapy.
<b>CHENOPODIUM OIL.</b> ----- <i>Oleum Chenopodii.</i>	1 cc.-----	℥ xv.-----	Anthelmintic.
<b>CHENOPODIUM OIL CAPSULES.</b> ----- <i>Capsulae Olei Chenopodii.</i>	1 cc.-----	℥ xv.-----	Anthelmintic.
<b>CHERRY, WILD, FLUIDEXTRACT.</b> ----- <i>Fluidextractum Pruni Virginianae.</i>	2 cc.-----	℥ xxx.-----	Flavor.
<b>CHINOFON.</b> ----- <i>Chinofonum.</i>	1 Gm.-----	grs. xv.-----	Amebicide.
<b>CHINOFON TABLETS.</b> ----- <i>Tabellae Chinofoni.</i>	1 Gm.-----	grs. xv.-----	Amebicide.
<b>CHLORAL HYDRATE.</b> ----- <i>Chloralis Hydras.</i>	0.6 Gm.-----	grs. x.-----	Hypnotic.
<b>CHLOROBUTANOL.</b> ----- <i>Chlorobutanol.</i>	0.6 Gm.-----	grs. x.-----	Hypnotic Antiseptic.
<b>CHLOROFORM SPIRIT.</b> ----- <i>Spiritus Chloroformi.</i>	2 cc.-----	℥ xxx.-----	Carminative.
<b>CHLOROFORM WATER.</b> ----- <i>Aqua Chloroformi.</i>	15 cc.-----	f 3 iv.-----	Carminative.
<b>CHOLERA VACCINE.</b> ----- <i>Vaccinum Cholerae.</i>	0.5 cc.; 1 cc.-----	-----	Anticholera.
<b>CIMICFUGA.</b> ----- <i>Cimicifuga.</i>	1 Gm.-----	grs. xv.-----	Stomachic; Alterative.
<b>CIMICFUGA FLUIDEXTRACT.</b> ----- <i>Fluidextractum Cimicifugae.</i>	1 cc.-----	℥ xv.-----	Stomachic; Alterative.

<sup>10</sup> MgCO<sub>3</sub>—32.5 mg.; K<sub>2</sub>CO<sub>3</sub>—1.5 mg.; Opium Tincture—0.0125 cc.

<sup>11</sup> Cataria—50 mg.; Fennel—20 mg.; Sodium Bicarbonate—9 mg.

English name and Latin title	Metric dose	Apothecary dose	Action or use
CINCHONA. <i>Cinchona.</i>	1 Gm	grs. xv	Antimalarial; bitter tonic.
CINCHONA ALKALOIDS ELIXIR. <i>Elixir Cinchonae Alkaloidorum.</i>	8 cc. <sup>12</sup>	℥ ii	Astringent bitter.
CINCHONA TINCTURE, COMPOUND. <i>Tinctura Cinchonae Composita.</i>	4 cc.	℥ i	Bitter tonic.
CINCHONIDINE SULFATE. <i>Cinchonidinae Sulfas.</i>	0.15 Gm	grs. iiss	Antiperiodic bitter tonic.
CINCHONINE SULFATE. <i>Cinchoninae Sulfas.</i>	0.15 Gm	grs. iiss	Antiperiodic bitter tonic.
CINCHOPHEN. <i>Cinchophenum.</i>	0.5 Gm	grs. viiss	Analgesic; Antipyretic.
CINCHOPHEN TABLETS. <i>Tabellae Cinchopheni.</i>	0.5 Gm	grs. viiss	Analgesic; Antipyretic.
CINNAMON SPIRIT. <i>Spiritus Cinnamoni.</i>	1 cc	℥ xv	Carminative; Astringent.
CINNAMON TINCTURE. <i>Tinctura Cinnamoni.</i>	1 cc	℥ xv	Carminative; Astringent.
COD LIVER OIL. <i>Oleum Morrhuae.</i>	8cc. <sup>13</sup>	℥ ii	Antirachitic.
COD LIVER OIL EMULSION. <i>Emulsum Olei Morrhuae.</i>	8 cc. <sup>13</sup>	℥ ii	Antirachitic.
COCAINE HYDROCHLORIDE TABLETS. <i>Tabellae Cocainae Hydrochloridi.</i>	15 mg	gr. ¼	Circulatory stimulant.
COD LIVER OIL EMULSION WITH MALT. <i>Emulsum Olei Morrhuae cum Malto.</i>	15 cc	℥ iv	Antirachitic.
CODEINE. <i>Codeina.</i>	30 mg	gr. ss	Analgesic; Hypnotic.
CODEINE PHOSPHATE. <i>Codeinae Phosphas.</i>	30 mg	gr. ss	Analgesic; Hypnotic.
CODEINE PHOSPHATE TABLETS. <i>Tabellae Codeinae Phosphatis.</i>	30 mg	gr. ss	Analgesic; Hypnotic.
CODEINE SULFATE. <i>Codeinae Sulfas.</i>	30 mg	gr. ss	Analgesic; Hypnotic.
CODEINE SULFATE TABLETS. <i>Tabellae Codeinae Sulfas.</i>	30 mg	gr. ss	Analgesic; Hypnotic.
COLCHICINE. <i>Colchicina.</i>	0.5 mg	gr. ⅓ <sub>20</sub>	Analgesic.
COLCHICINE TABLETS. <i>Tabellae Colchicinae.</i>	0.5 mg	gr. ⅓ <sub>20</sub>	Analgesic.
COLCHICUM CORN FLUIDEXTRACT. <i>Fluidextractum Colchici Cormi.</i>	0.25 cc	℥ iv	Analgesic.
COLCHICUM CORN TINCTURE, STRONG. <i>Tinctura Colchici Cormi Fortis.</i>	0.6 cc	℥ x	Analgesic.
COLCHICUM SEED FLUIDEXTRACT. <i>Fluidextract Colchici Seminis.</i>	0.2 cc	℥ iii	Analgesic.
COLCHICUM SEED TINCTURE. <i>Tinctura Colchici Seminis.</i>	2 cc	℥ xxx	Analgesic.
COLOCYNTH. <i>Colocynthis.</i>	0.125 Gm	grs. ii	Hydragogue cathartic.
COLOCYNTH AND JALAP PILLS, COMPOUND. <i>Pilulae Colocynthis et Jalapae Compositae.</i>	1 pill <sup>14</sup>		Hydragogue cathartic.
COLOCYNTH EXTRACT. <i>Extractum Colocynthis.</i>	30 mg	gr. ss	Hydragogue cathartic.
COLOCYNTH EXTRACT, COMPOUND. <i>Extractum Colocynthis Compositum.</i>	0.25 Gm. <sup>15</sup>	grs. iv	Hydragogue cathartic.
CONVALLARIA. <i>Convallaria.</i>	30 mg	gr. ss	Cardiac tonic.
COPAIBA. <i>Copaiba.</i>	1 cc	℥ xv	Diuretic.
COPAIBA MIXTURE. <i>Mistura Copaibae.</i>	8 cc. <sup>16</sup>	℥ ii	Diuretic.

<sup>12</sup> Quinine Sulfate—16 mg.; Cinchonidine Sulfate—8 mg.; Cinchonine Sulfate—8 mg.

<sup>13</sup> Daily.

<sup>14</sup> Compound Colocynth Extract—60 mg.; Hyoscyamus Extract—30 mg.; Jalap Resin—20 mg.; Leptandra Extract—15 mg.; Podophyllum Resin—15 mg.

<sup>15</sup> Colocynth Extract—40 mg.; Ipomea Resin—35 mg.; Aloe—0.1625 Gm.

<sup>16</sup> Copaiba—1 cc.; Sodium Nitrite—24 mg.; Potassium Hydroxide Solution—0.24 cc.

English name and Latin title	Metric dose	Apothecary dose	Action or use
<b>CORIANDER</b> ..... <i>Coriandrum</i> .	2 Gm. ....	grs. xxx	Carminative.
<b>COTARNINE CHLORIDE</b> ..... <i>Cotarninae Chloridum</i> .	60 mg. ....	grs. i.	Hemostatic.
<b>COTTON ROOT BARK</b> ..... <i>Gossypil Radicis Cortex</i> .	2 Gm. ....	grs. xxx	Emmenagogue; Oxytocic.
<b>CREOSOTE</b> ..... <i>Creosotum</i> .	0.25 cc. ....	℥ iv	Intestinal antiseptic.
<b>CREOSOTE CARBONATE</b> ..... <i>Creosoti Carbonas</i> .	1 Gm. ....	grs. xv	Intestinal antiseptic.
<b>CUBEBA</b> ..... <i>Cubeba</i> .	2 Gm. ....	grs.	Antiseptic; Diuretic.
<b>CUBEBA OLEORESIN</b> ..... <i>Oleoresina Cubebae</i> .	0.5 Gm. ....	grs. viiss	Antiseptic; Diuretic.
<b>DICHLOROPHENARSINE HYDROCHLORIDE</b> ..... <i>Dichlorophenarsina Hydrochloridum</i> .	45 mg. ....	gr. ¾	Antisypheletic.
<b>DIETHYSTIBESTROL</b> ..... <i>Diethylstibestrol</i> .	0.5 mg. ....	gr. ¼ <sub>100</sub>	Estrogenic.
<b>DIETHYSTIBESTROL CAPSULES</b> ..... <i>Capsulae Diethylstibestrolis</i> .	0.5 mg. ....	gr. ¼ <sub>100</sub>	Estrogenic.
<b>DIETHYSTIBESTROL INJECTION</b> ..... <i>Injectio Diethylstibestrolis</i> .	0.5 mg. ....	gr. ¼ <sub>100</sub>	Estrogenic.
<b>DIETHYSTIBESTROL TABLETS</b> ..... <i>Tabellae Diethylstibestrolis</i> .	0.5 mg. ....	gr. ¼ <sub>100</sub>	Estrogenic.
<b>DIGITALIS CAPSULES</b> ..... <i>Capsulae Digitalis</i> .	0.1 Gm. ....	grs. iss	Cardic stimulant.
<b>DIGITALIS INFUSION</b> ..... <i>Infusum Digitalis</i> .	6 cc. ....	℥ 3 iss	Cardic stimulant.
<b>DIGITALIS POWDERED</b> ..... <i>Digitalis Pulverata</i> .	0.1 Gm. ....	grs. iss	Cardic stimulant.
<b>DIGITALIS TABLETS</b> ..... <i>Tabellae Digitalis</i> .	0.1 Gm. ....	grs. iss	Cardic stimulant.
<b>DIGITALIS TINCTURE</b> ..... <i>Tinctura Digitalis</i> .	1 cc. ....	℥ xv	Cardic stimulant.
<b>DIGITOXIN</b> ..... <i>Digitoxinum</i> .	0.1 mg. ....	gr. ¼ <sub>100</sub>	Heart tonic.
<b>DIGITOXIN TABLETS</b> ..... <i>Tabellae Digitoxini</i> .	0.1 mg. ....	gr. ¼ <sub>100</sub>	Heart tonic.
<b>DIGOXIN</b> ..... <i>Digoxinum</i> .	0.5 mg. ....	gr. ¼ <sub>20</sub>	Heart tonic.
<b>DIGOXIN TABLETS</b> ..... <i>Tabellae Digoxini</i> .	0.5 mg. ....	gr. ¼ <sub>20</sub>	Heart tonic.
<b>DIHYDROMORPHINONE HYDROCHLORIDE</b> ..... <i>Dihydromorphinoni Hydrochloridum</i> .	2 mg. ....	gr. ¼ <sub>10</sub>	Narcotic; Sedative.
<b>DIHYDROMORPHINONE HYDROCHLORIDE TABLETS</b> ..... <i>Tabellae Dihydromorphinoni, Hydrochloridum</i> .	2 mg. ....	gr. ¼ <sub>10</sub>	Narcotic; Sedative.
<b>DIPHENYLHYDANTOIN SODIUM</b> ..... <i>Diphenylhydantoinum Sodicum</i> .	0.1 Gm. ....	grs. iss	Anticonvulsant.
<b>DIPHENYLHYDANTOIN SODIUM CAPSULES</b> ..... <i>Capsulae Diphenylhydantoini Sodici</i> .	0.1 Gm. ....	grs. iss	Anticonvulsant.
<b>DIPHTHERIA and TETANUS TOXOIDS</b> ..... <i>Toxoida Diphtherica et Tetanica</i> .	1 cc. <sup>17</sup> .....		Immunization.
<b>ALUM PRECIPITATED DIPHTHERIA and TETANUS TOXOIDS</b> ..... <i>Toxoida Diphtherica et Tetanica Alumenpraecipitata</i> .	1 cc. <sup>18</sup> .....		Immunization.
<b>DIPHTHERIA ANTITOXIN</b> ..... <i>Antitoxinum Diphthericum</i> .	( <sup>19</sup> ) .....		Curative; Prophylaxis.
<b>DIPHTHERIA TOXIN, DIAGNOSTIC</b> ..... <i>Toxinum Diphthericum Diagnosticum</i> .	0.1 cc. ....		Diagnostic.

<sup>17</sup> To be repeated twice with intervals of about 3 weeks between injections.

<sup>18</sup> To be repeated once with an interval of 4 to 6 weeks.

<sup>19</sup> Therapeutic—20,000 units; prophylactic—1,000 units.

English name and Latin title	Metric dose	Apothecary dose	Action or use
<b>DIPHThERIA TOXOID</b> ----- <i>Toxoidum Diphthericum.</i>	1 cc. <sup>20</sup> -----	-----	Immunization.
<b>DIPHThERIA TOXOID, ALUM PRECIPITATED.</b> ----- <i>Toxoidum Diphthericum Alumen-præcipitatum.</i>	1 cc. <sup>21</sup> -----	-----	Immunization.
<b>ECHINACEA</b> ----- <i>Echinacea.</i>	1 Gm -----	grs. xv -----	Tonic.
<b>EFFERVESCENT POWDERS, COMPOUND.</b> ----- <i>Pulveres Effervescentes Compositi</i>	( <sup>22</sup> ) -----	-----	Aperient.
<b>EMETINE HYDROCHLORIDE INJECTION.</b> ----- <i>Injectio Emetinae Hydrochloridi.</i>	60 mg. -----	gr. i -----	Amebicide; Emetic.
<b>EPHEDRINE HYDROCHLORIDE</b> ----- <i>Ephedrinae Hydrochloridum.</i>	25 mg. -----	gr. $\frac{3}{4}$ -----	Vasoconstrictor; Stimulant.
<b>EPHEDRINE HYDROCHLORIDE TABLETS.</b> ----- <i>Tabellae Ephedrinae Hydrochloridi.</i>	25 mg. -----	gr. $\frac{3}{4}$ -----	Vasoconstrictor; Stimulant.
<b>EPHEDRINE SULFATE</b> ----- <i>Ephedrinae Sulfas.</i>	25 mg. -----	gr. $\frac{3}{4}$ -----	Vasoconstrictor; Stimulant.
<b>EPHEDRINE SULFATE TABLETS.</b> ----- <i>Tabellae Ephedrinae Sulfatis</i>	25 mg. -----	gr. $\frac{3}{4}$ -----	Vasoconstrictor; Stimulant.
<b>EPHEDRINE SULFATE AMPULS.</b> ----- <i>Ampullae Ephedrinae Sulfatis</i>	50 mg. -----	gr. $\frac{3}{4}$ -----	Vasoconstrictor; Stimulant.
<b>EPHEDRINE SULFATE CAPSULES.</b> ----- <i>Capsulae Ephedrinae Sulfatis.</i>	25 mg. -----	gr. $\frac{3}{4}$ -----	Vasoconstrictor; Stimulant.
<b>EPHEDRINE SULFATE AND PHENOBARBITAL CAPSULES.</b> ----- <i>Capsulae Ephedrinae Sulfatis et Phenobarbitalis.</i>	1 cap. <sup>23</sup> -----	-----	Antispasmodic; Sedative.
<b>EPHEDRINE SULFATE SYRUP.</b> ----- <i>Syrupus Ephedrinae Sulfatis</i>	4 cc. -----	f℥ i -----	Vasoconstrictor; Stimulant.
<b>EPINEPHRINE INJECTION.</b> ----- <i>Injectio Epinephrinae.</i>	1 mg. -----	gr. $\frac{1}{60}$ -----	Vasoconstrictor; Stimulant.
<b>ERGONOVINE MALEATE</b> ----- <i>Ergonovinae Maleas.</i>	0.5 mg. -----	gr. $\frac{1}{120}$ -----	Oxytocic; Emmenagogue.
<b>ERGONOVINE MALEATE INJECTION.</b> ----- <i>Injectio Ergonovinae Maleatis.</i>	0.2 mg. -----	gr. $\frac{1}{600}$ -----	Oxytocic; Emmenagogue.
<b>ERGONOVINE MALEATE TABLETS.</b> ----- <i>Tabellae Ergonovinae Maleatis.</i>	0.5 mg. -----	gr. $\frac{1}{120}$ -----	Oxytocic; Emmenagogue.
<b>ERGOT EXTRACT</b> ----- <i>Extractum Ergotae.</i>	0.5 Gm -----	grs. viiss -----	Oxytocic.
<b>ERGOT FLUIDEXTRACT</b> ----- <i>Fluidextractum Ergotae.</i>	2 cc. -----	℥ xxx -----	Oxytocic.
<b>ERGOT, PREPARED</b> ----- <i>Ergota Praeparata.</i>	1.5 Gm -----	grs. xxii -----	Oxytocic.
<b>ERGOTAMINE TARTRATE</b> ----- <i>Ergotaminae Tartras.</i>	1 mg. -----	gr. $\frac{1}{60}$ -----	Oxytocic.
<b>ERGOTAMINE TARTRATE TABLETS.</b> ----- <i>Tabellae Ergotaminae Tartratis.</i>	1 mg. -----	gr. $\frac{1}{60}$ -----	Oxytocic.
<b>ERIODICTION FLUIDEXTRACT</b> ----- <i>Fluidextractum Eriodictyi.</i>	1 cc. -----	℥ xv -----	Expectorant; Bitter tonic.
<b>ERIODICTION SYRUP, AROMATIC</b> ----- <i>Syrupus Eriodictyi Aromaticus.</i>	8 cc. -----	f℥ ii -----	Expectorant; Bitter tonic.
<b>ERYTHRITYL TETRANITRATE TABLETS.</b> ----- <i>Tabellae Erythritylis Tetranitratis.</i>	30 mg. -----	gr. ss -----	Vasodilator; Antispasmodic.
<b>ESTRADIOL</b> ----- <i>Estradiol.</i>	0.2 mg. -----	gr. $\frac{1}{600}$ -----	Estrogenic.
<b>ESTRADIOL BENZOATE</b> ----- <i>Estradiolis Benzoas.</i>	1 mg. -----	gr. $\frac{1}{60}$ -----	Estrogenic.
<b>ESTRONE</b> ----- <i>Estronum.</i>	1 mg. -----	gr. $\frac{1}{60}$ -----	Amenorrhea.

<sup>20</sup> Or as specified on label.

<sup>21</sup> Or as specified on label. To be repeated once with an interval of 4 to 6 weeks.

<sup>22</sup> Contents of a white and a blue paper.

<sup>23</sup> Ephedrine Sulfate—25 mg.; Phenobarbital—30 mg.

English name and Latin title	Metric dose	Apothecary dose	Action or use
ETHER SPIRIT..... <i>Spiritus Aetheris.</i>	4 cc. <sup>24</sup> .....	f℥ i.....	Carminative; Stimulant.
ETHER SPIRIT, COMPOUND..... <i>Spiritus Aetheris Compositus.</i>	4 cc. <sup>24</sup> .....	f℥ i.....	Carminative; Stimulant.
ETHER ACETATE..... <i>Aethylis Acetas.</i>	1 cc.....	℥ xv.....	Carminative.
ETHYL CHAULMOOGRATE..... <i>Aethylis Chaulmoogra.</i>	2 cc.....	℥ xxx.....	Leper therapy.
ETHYLMORPHINE HYDROCHLORIDE..... <i>Aethylmorphinae Hydrochloridum.</i>	15 mg.....	gr. ¼.....	Sedative; Antispasmodic.
EUCALYPTUS OIL..... <i>Oleum Eucalypti.</i>	0.5 cc.....	℥ viii.....	Antiseptic; Febrifuge.
EUPATORIUM..... <i>Eupatorium.</i>	2 Gm.....	grs. xxx.....	Diaporetic.
EXPECTORANT MIXTURE..... <i>Mistura Pectoralis.</i>	4 cc. <sup>25</sup> .....	f℥ i.....	Expectorant.
FENNEL..... <i>Foeniculum.</i>	1 Gm.....	grs. xv.....	Carminative.
FERRIC AMMONIUM CITRATE..... <i>Ferri Ammonii Citras.</i>	1 Gm.....	grs. xv.....	Hematinic.
FERRIC AMMONIUM CAPSULES..... <i>Capsulae Ferri Ammonii Citras.</i>	1 Gm.....	grs. xv.....	Hematinic.
FERRIC AMMONIUM, GREEN..... <i>Ferri Ammonii Citras Viridis.</i>	0.1 Gm.....	grs. iss.....	Hematinic.
FERRIC AMMONIUM, GREEN, AMPULS..... <i>Ampullae Ferri Ammonii Citratis Viridis.</i>	0.1 Gm.....	grs. iss.....	Hematinic.
FERRIC CACODYLATE..... <i>Ferri Cacodylas.</i>	60 mg.....	gr. i.....	Chalybeate; Alterative.
FERRIC CACODYLATE AMPULS..... <i>Ampullae Ferri Cacodylatis.</i>	60 mg.....	gr. i.....	Chalybeate; Alterative.
FERRIC CHLORIDE SOLUTION..... <i>Liquor Ferri Chloridi.</i>	0.1 cc.....	℥ iss.....	Astringent; Styptic.
FERRIC CHLORIDE TINCTURE..... <i>Tinctura Ferri Chloridi.</i>	0.6 cc.....	℥ x.....	Astringent; Styptic.
FERRIC CITROCHLORIDE TINCTURE..... <i>Tinctura Ferri Citrochloridi.</i>	0.5 cc.....	℥ viii.....	Astringent; Styptic.
FERRIC GLYCEROPHOSPHATE..... <i>Ferri Glycerophosphas.</i>	0.2 Gm.....	grs. iii.....	Hematinic.
FERRIC HYPOPHOSPHITE..... <i>Ferri Hypophosphis.</i>	0.2 Gm.....	grs. iii.....	Hematinic.
FERRIC PHOSPHATE, SOLUBLE..... <i>Ferri Phosphas Solubilis.</i>	0.25 Gm.....	grs. iv.....	Hematinic.
FERRIC CARBONATE MASS..... <i>Massa Ferri Carbonatis.</i>	0.6 Gm.....	grs. x.....	Hematinic.
FERROUS CARBONATE PILLS..... <i>Pilulae Ferri Carbonatis.</i>	5 pils.....		Hematinic.
FERROUS CARBONATE, SACCHARATED..... <i>Ferri Carbonas Saccharatus.</i>	0.25 Gm.....	grs. iv.....	Hematinic.
FERROUS CARBONATE, SACCHARATED, CAPSULES..... <i>Capsulae Ferri Carbonatis Saccharati.</i>	0.25 Gm.....	grs. iv.....	Hematinic.
FERROUS GLUCONATE..... <i>Ferri Gluconas.</i>	0.3 Gm.....	grs. v.....	Hematinic.
FERROUS IODINE SYRUP..... <i>Syrupus Ferri Iodidi.</i>	1 cc. <sup>26</sup> .....	℥ xv.....	Alterative; Tonic.
FERROUS SULFATE..... <i>Ferri Sulfas.</i>	0.3 Gm.....	grs. v.....	Hematinic.
FERROUS SULFATE, EXSICCATED..... <i>Ferri Sulfas Exsiccatus.</i>	0.2 Gm.....	grs. iii.....	Hematinic.
FERROUS SULFATE SYRUP..... <i>Syrupus Ferri Sulfatis.</i>	8 cc. <sup>27</sup> .....	f℥ ii.....	Hematinic.

<sup>24</sup> Ethyl Oxide—1.3 cc.

<sup>25</sup> Ammonium Carbonate—72 mg; Senega Fluidextract—0.14 cc.; Squill Fluidextract—0.14 cc.; Camphorated Opium Tincture—0.7 cc.

<sup>26</sup> Ferrous Iodide—70 mg.

<sup>27</sup> Ferrous Sulfate—0.32 Gm.

English name and Latin title	Metric dose	Apothecary dose	Action or use
<b>FERROUS SULFATE TABLETS.</b> ----- <i>Tabellae Ferri Sulfatis.</i>	0.3 Gm.	grs. v	Hematinic.
<b>FORMIC ACID.</b> ----- <i>Acidum Formicum.</i>	0.3 cc.	℥ v	Diuretic; Antirheumatic.
<b>FORMIC ACID SPIRIT.</b> ----- <i>Spiritus Acidi Formici.</i>	4 cc. <sup>38</sup>	f℥ i	Diuretic; Antirheumatic.
<b>GAMBOGEE.</b> ----- <i>Cambogia.</i>	0.125 Gm.	grs. ii	Hydiagogue; Cathartic.
<b>GAMBIR.</b> ----- <i>Gambir.</i>	0.5 Gm.	grs. xiiss	Astringent.
<b>GAMBIR TINCTURE, COMPOUND.</b> ----- <i>Tinctura Gambir Composita.</i>	2 cc.	℥ xxx	Astringent.
<b>GELSEMIUM.</b> ----- <i>Gelsemium.</i>	30 mg.	gr. ss.	Antineuralgic; Antispasmodic.
<b>GELSEMIUM FLUIDEXTRACT.</b> ----- <i>Fluidextractum Gelsemii.</i>	0.03 cc.	℥ ss.	Antineuralgic; Antispasmodic.
<b>GELSEMIUM TINCTURE.</b> ----- <i>Tinctura Gelsemii.</i>	0.3 cc.	℥ v	Antineuralgic; Antispasmodic.
<b>GENTIAN EXTRACT.</b> ----- <i>Extractum Gentianae.</i>	0.5 Gm.	grs. viiss	Simple bitter.
<b>GENTIAN FLUIDEXTRACT.</b> ----- <i>Fluidextractum Gentianae.</i>	1 cc.	℥ xv	Simple bitter.
<b>GENTIAN TINCTURE, COMPOUND.</b> ----- <i>Tinctura Gentianae Composita.</i>	4 cc.	f℥ i	Simple bitter.
<b>GINGER.</b> ----- <i>Zingiber.</i>	0.6 Gm.	grs. x	Carminative.
<b>GINGER OLEORESIN.</b> ----- <i>Oleoresina Zingiberis.</i>	30 mg.	gr. ss.	Carminative.
<b>GINGER SYRUP.</b> ----- <i>Syrupus Zingiberis.</i>	10 cc. <sup>39</sup>	f℥ iiss	Carminative.
<b>GLYCEROPHOSPHATES ELIXIR, COMPOUND.</b> ----- <i>Elixir Glycerophosphatum Compositum.</i>	8 cc. <sup>40</sup>	f℥ ii	Tonic.
<b>GLYCERYL TRINITRATE TABLETS.</b> ----- <i>Tabellae Glycerylis Trinitratis.</i>	0.4 mg.	gr. 1/500	Vasodilator.
<b>GLYCERYL TRINITRATE SPIRIT.</b> ----- <i>Spiritus Glycerylis Trinitratis.</i>	0.06 cc.	℥ i	Vasodilator.
<b>GLYCYRRHIZA FLUIDEXTRACT.</b> ----- <i>Fluidextractum Glycyrrhizae.</i>	2 cc.	℥ xxx	Expectorant; Demulcent.
<b>GRINDELIA.</b> ----- <i>Grindelia.</i>	2 Gm.	grs. xxx	Expectorant; Antispasmodic.
<b>GRINDELIA FLUIDEXTRACT.</b> ----- <i>Fluidextractum Grindeliae.</i>	2 cc.	℥ xxx	Expectorant; Antispasmodic.
<b>GUAIAC.</b> ----- <i>Guaiacum.</i>	1 Gm.	grs. xv	Laxative; Diuretic.
<b>GUAIAC, TINCTURE AMMONIATED.</b> ----- <i>Tinctura Guaiaci Ammoniata.</i>	2 cc.	℥ xxx	Laxative; Diuretic.
<b>GUAIACOL.</b> ----- <i>Guaiacol.</i>	0.5 cc.	℥ viii	Analgesic; Antipyretic.
<b>HALIBUT LIVER OIL.</b> ----- <i>Oleum Hippoglossi.</i>	0.1 cc.	℥ iss	Vitamins A and D.
<b>HALIBUT LIVER OIL CAPSULES.</b> ----- <i>Capsulae Olei Hippoglossi.</i>	1 cap. <sup>41</sup>		Vitamins A and D.
<b>HAMAMELIS LEAF.</b> ----- <i>Hamamelidis Folium.</i>	2 Gm.	grs. xxx	Astringent.
<b>HAMAMELIS LEAF FLUIDEXTRACT.</b> ----- <i>Fluidextractum Hamamelidis Folii.</i>	2 cc.	℥ xxx	Astringent.
<b>HEXYLRESORCINOL.</b> ----- <i>Hexylresorcinol.</i>	1 Gm.	grs. xv	Anthelmintic; Antiseptic.
<b>HEXYLRESORCINOL PILLS.</b> ----- <i>Pilulae Hexylresorcinolis.</i>	1 Gm.	grs. xv	Anthelmintic; Antiseptic.
<b>HISTAMINE PHOSPHATE.</b> ----- <i>Histaminæ Phosphas.</i>	0.3 mg.	gr. 1/20	Vasoconstrictor; Diagnostic.

<sup>38</sup> Formic Acid—0.16 cc.

<sup>39</sup> Ginger Fluidextract—0.3 cc.

<sup>40</sup> Sodium Glycerophosphate—0.28 Gm.; Calcium Glycerophosphate—0.128 Gm.; Ferric Glycerophosphate—24 mg., Manganese Glycerophosphate—16 mg.; Quinine hydrochloride—7 mg.; Strychnine Nitrate—1 mg.

<sup>41</sup> 5,000 USP Vitamin A Units.

English name and Latin title	Metric dose	Apothecary dose	Action or use
<b>HISTAMINE PHOSPHATE INJECTION.</b> <i>Injectio Histaminae Phosphatis.</i>	0.3 mg.	gr. $\frac{1}{20}$	Vasoconstrictor; Diagnostic.
<b>HISTIDINE MONOHYDROCHLORIDE.</b> <i>Histidinae Monohydrochloridum.</i>	0.2 Gm.	grs. iii.	Peptic ulcer.
<b>HOMATROPINE METHYLBROMIDE TABLETS.</b> <i>Tabellae Homatropinae Methylbromidi.</i>	2.5 mg.	gr. $\frac{1}{4}$	Antispasmodic; Antacid.
<b>HYDRASTINE HYDROCHLORIDE.</b> <i>Hydrastinae Hydrochloridum.</i>	10 mg.	gr. $\frac{1}{6}$	Astringent; Hemostatic.
<b>HYDRASTIS.</b> <i>Hydrastis.</i>	2 Gm.	gr. xxx.	Hemostatic; Antiperiodic.
<b>HYDRASTIS EXTRACT.</b> <i>Extractum Hydrastis.</i>	0.5 Gm.	grs. viiss.	Hemostatic; Antiperiodic.
<b>HYDRASTIS TINCTURE.</b> <i>Tinctura Hydrastis.</i>	8 cc.	f $\overline{3}$ ii.	Hemostatic; Antiperiodic.
<b>HYDRASTIS FLUIDEXTRACT.</b> <i>Fluidextractum Hydrastis.</i>	2 cc.	m xxx.	Hemostatic; Antiperiodic.
<b>HYDRIODIC ACID SYRUP.</b> <i>Syrupus Acidi Hydriodici.</i>	4 cc.	f $\overline{3}$ i.	Alterative.
<b>HYDROCHLORIC ACID, DILUTED.</b> <i>Acidum Hydrochloricum Dilutum.</i>	4 cc.	f $\overline{3}$ i.	Increases gastric acidity.
<b>HYOSCYAMUS.</b> <i>Hyoscyamus.</i>	0.2 Gm.	grs. iii.	Antispasmodic.
<b>HYOSCYAMUS EXTRACT.</b> <i>Extractum Hyoscyami.</i>	50 mg.	gr. $\frac{3}{4}$	Antispasmodic.
<b>HYOSCYAMUS FLUIDEXTRACT.</b> <i>Fluidextractum Hyoscyami.</i>	0.2 Gm.	m iii.	Antispasmodic.
<b>HYOSCYAMUS TINCTURE.</b> <i>Tinctura Hyoscyami.</i>	2 cc.	m xxx.	Antispasmodic.
<b>HYPOPHOSPHITES SYRUP.</b> <i>Syrupus Hypophosphitum.</i>	8 cc. <sup>32</sup>	f $\overline{3}$ ii.	Nutrient; Placebo.
<b>HYPOPHOSPHITES SYRUP, COMPOUND.</b> <i>Syrupus Hypophosphitum Compositus.</i>	8 cc. <sup>33</sup>	f $\overline{3}$ ii.	Nutrient; Placebo.
<b>ICHTHAMMOL.</b> <i>Ichthammol.</i>	0.2 Gm.	grs. iii.	Emollient.
<b>IODINE SOLUTION, STRONG.</b> <i>Liquor Iodi Fortis.</i>	0.3 cc.	m v.	Alterative.
<b>IODOCHLOROXYQUINOLINE.</b> <i>Iodochloroxyquinolinum.</i>	0.25 Gm.	grs. iv.	Amembacide.
<b>IODOCHLOROXYQUINOLINE TABLETS.</b> <i>Tabellae Iodochloroxyquinolini.</i>	0.25 Gm.	grs. iv.	Amembacide.
<b>IODOPHTHALEIN SODIUM.</b> <i>Iodophthaleinum Nadicum.</i>	0.5 Gm. <sup>34</sup>	grs. viiss.	Diagnostic.
<b>IPECAC.</b> <i>Ipecacuanha.</i>	0.5 Gm.	grs. viiss.	Expectorant.
<b>IPECAC FLUIDEXTRACT.</b> <i>Fluidextractum Ipecacuanhae.</i>	0.5 cc.	m viii.	Expectorant.
<b>IPECAC AND OPIUM POWDER.</b> <i>Pulvis Ipecacuanhae et Opii.</i>	0.3 Gm. <sup>35</sup>	grs. v.	Diaphoretic; Sedative.
<b>IPECAC SYRUP.</b> <i>Syrupus Ipecacuanhae.</i>	8 cc.	f $\overline{3}$ ii.	Expectorant.
<b>IPECAC AND OPIUM SYRUP.</b> <i>Syrupus Ipecacuanhae et Opii.</i>	4 cc. <sup>36</sup>	f $\overline{3}$ i.	Diaphoretic; Sedative.
<b>IPECAC TINCTURE.</b> <i>Tinctura Ipecacuanhae.</i>	0.6 cc.	m x.	Expectorant.
<b>IPECAC AND OPIUM TINCTURE.</b> <i>Tinctura Ipecacuanhae et Opii.</i>	0.5 cc. <sup>37</sup>	m iii.	Diaphoretic; Sedative.

<sup>32</sup> Calcium Hypophosphite—0.28 Gm.; Potassium Hypophosphite—0.14 Gm.; Sodium Hypophosphite—0.14 Gm.

<sup>33</sup> Calcium Hypophosphite—0.28 Gm.; Potassium Hypophosphite—0.14 Gm.; Sodium Hypophosphite—0.14 Gm.; Ferric Hypophosphite—18 mg.; Manganese Hypophosphite—18 mg.; Quinine—9 mg.; Strychnine—0.8 mg.

<sup>34</sup> Oral—for each 10 Kgm. body weight; Intravenous—0.3 Gm.

<sup>35</sup> 30 mg. each of Ipecac and Opium.

<sup>36</sup> 0.34 cc. Ipecac and Opium Tincture.

<sup>37</sup> Ferric Chloride Tincture—0.6 cc.

English name and Latin title	Metric dose	Apothecary dose	Action or use
IPOMEA..... <i>Ipomoea.</i>	1 Gm.....	grs. xv.....	Purgative.
IPOMEA RESIN..... <i>Resina Ipomoeae.</i>	0.2 Gm.....	grs. iii.....	Purgative.
IRON AND AMMONIUM ACETATE SOLUTION. <i>Liquor Ferri et Ammonii Acetatis.</i>	15 cc. <sup>38</sup> .....	f℥ iv.....	Hematinic.
IRON, PEPTONIZED..... <i>Ferrum Peptonatum.</i>	0.3 Gm.....	grs. v.....	Mild hematinic.
IRON, PEPTONIZED, AND MANGANESE SOLUTION. <i>Liquor Ferri Peptonati et Mangani.</i>	8 cc. <sup>39</sup> .....	f℥ ii.....	Hematinic.
IRON, QUININE AND STRYCHNINE ELIXIR..... <i>Elixir Ferri, Quininae et Strychninae.</i>	4 cc. <sup>40</sup> .....	f℥ i.....	"Tonic."
IRON, QUININE AND STRYCHNINE PHOSPHATES ELIXIR. <i>Elixir Ferri, Quininae et Strychninae Phosphatum.</i>	4 cc. <sup>41</sup> .....	f℥ i.....	"Tonic."
IRON, REDUCED..... <i>Ferrum Reduction.</i>	0.5 Gm.....	grs. vii ss.....	Chalybeate.
IRON, REDUCED, CAPSULES..... <i>Capsulae Ferri Reducti.</i>	0.5 Gm.....	grs. vii ss.....	Chalybeate.
JALAP..... <i>Jalap.</i>	1 Gm.....	grs. xv.....	Drastic cathartic.
JALAP POWDER, COMPOUND..... <i>Pulvis Jalapae Compositus.</i>	2 Gm. <sup>42</sup> .....	grs. xxx.....	Drastic cathartic.
JALAP RESIN..... <i>Resina Jalapae.</i>	0.125 Gm.....	grs. ii.....	Drastic cathartic.
JUNIPER..... <i>Juniperus.</i>	4 Gm.....	grs. Lx.....	Local irritant.
KAMALA..... <i>Kamala.</i>	7.5 Gm.....	℥ ii.....	Purgative.
KAOLIN..... <i>Kaolinum.</i>	15 to 60 Gm.....	℥ ss to ℥ ii	Adsorbant.
KINO..... <i>Kino.</i>	0.5 Gm.....	grs. vii ss.....	Astringent.
KINO TINCTURE..... <i>Tinctura Kino.</i>	2 cc.....	℥ xxx.....	Astringent.
KOLA..... <i>Kola.</i>	4 Gm.....	grs. Lx.....	Diuretic; Stimulant.
LANATOSIDE C..... <i>Lanatosidum C.</i>	0.5 mg.....	gr. 1/20.....	Cardiac stimulant.
LANATOSIDE C TABLETS..... <i>Tabellae Lanatosidi C.</i>	0.5 mg.....	gr. 1/20.....	Cardiac stimulant.
LEPTANDRA..... <i>Leptandra.</i>	1 Gm.....	grs. xv.....	Cathartic.
LEPTANDRA EXTRACT..... <i>Extractum Leptandra.</i>	0.25 Mg.....	grs. iv.....	Cathartic.
LITHIUM BENZOATE..... <i>Lithii Benzoas.</i>	1 Gm.....	grs. xv.....	Antirheumatic.
LITHIUM BROMIDE..... <i>Lithii Bromidum.</i>	1 Gm.....	grs. xv.....	Hypnotic.
LITHIUM CARBONATE..... <i>Lithii Carbonas.</i>	0.5 Gm.....	grs. vii ss.....	Antacid.
LITHIUM CITRATE..... <i>Lithii Citras.</i>	0.5 Gm.....	grs. vii ss.....	Diuretic.
LITHIUM SALICYLATE..... <i>Lithii Salicylas.</i>	1 Gm.....	grs. xv.....	Antirheumatic.
LOBELIA..... <i>Lobelia.</i>	0.1 Gm.....	gr. iss.....	Expectorant; Emetic.
LOBELIA FLUID EXTRACT..... <i>Fluidextractum Lobeliae.</i>	0.1 cc.....	℥ iss.....	Expectorant; Emetic.

<sup>38</sup> Opium Tincture—0.5 cc.; Ipecac Fluidextract—0.05 cc.

<sup>39</sup> Peptonized Iron—0.14 Gm.; Soluble Manganese Citrate—70 mg.

<sup>40</sup> Ferri Citrochloride Tincture—0.5 cc.; Quinine Hydrochloride—32 mg.; Strychnine Sulfate—0.7 mg.

<sup>41</sup> Soluble Ferric Phosphate—0.14 Gm.; Quinine Phosphate—20 mg.; Strychnine Phosphate—1 mg.

<sup>42</sup> Jalap—0.7 Gm.; Potassium Bitartrate—1.3 Gm.

English name and Latin title	Metric dose	Apothecary dose	Action or use
LOBELIA TINCTURE..... <i>Tinctura Lobeliae.</i>	1 cc.....	℥ xv.....	Expectorant; Emetic.
MAGNESIA MAGMA..... <i>Magma Magnesiae.</i>	4 cc. <sup>43</sup> .....	f 3 i.....	Laxative.
MAGNESIUM CARBONATE..... <i>Magnesiæ Carbonas.</i>	0.6 Gm. <sup>44</sup> .....	grs. x.....	Antacid.
MAGNESIUM CITRATE SOLUTION..... <i>Liquor Magnesii Citratis.</i>	200 cc.....	f 3 vii.....	Laxative.
MAGNESIUM HYDROXIDE..... <i>Magnesiæ Hydroxidum.</i>	0.3 Gm.....	grs. v.....	Antacid.
MAGNESIUM HYDROXIDE TABLETS..... <i>Tabellae Magnesii Hydroxidi.</i>	0.3 Gm.....	grs. v.....	Antacid.
MAGNESIUM OXIDE..... <i>Magnesiæ Oxidum.</i>	0.25 Gm. <sup>45</sup> .....	grs. iv.....	Antacid.
MAGNESIUM OXIDE, HEAVY..... <i>Magnesiæ Oxidum Ponderosum.</i>	0.25 Gm.....	grs. iv.....	Antacid.
MAGNESIUM PHOSPHATE, TRIBASIC..... <i>Magnesiæ Phosphas Tribasicus.</i>	1 Gm.....	grs. xv.....	Antacid.
MAGNESIUM PHOSPHATE, TRIBASIC, TABLETS..... <i>Tabellae Magnesii Phosphatis, Tribasici.</i>	1 Gm.....	grs. xv.....	Antacid.
MAGNESIUM SULFATE..... <i>Magnesiæ Sulfas.</i>	15 Gm.....	ʒ iv.....	Saline laxative.
MAGNESIUM TRISILICATE..... <i>Magnesiæ Trisilicas.</i>	1 Gm.....	grs. xv.....	Antacid.
MAGNESIUM TRISILICATE TABLETS..... <i>Tabellae Magnesii Trisilicatis.</i>	1 Gm.....	grs. xv.....	Antacid.
MALT EXTRACT..... <i>Extractum Malti.</i>	15 Gm.....	ʒ iv.....	Digestant.
MANDELIC ACID..... <i>Acidum Mandelicum.</i>	3 Gm.....	grs. xLv.....	Urinary antiseptic.
MANGANESE CITRATE, SOLUBLE..... <i>Mangani Citras Solubilis.</i>	0.2 Gm.....	grs. iii.....	Hematinic.
MANGANESE GLYCEROPHOSPHATE..... <i>Mangani Glycerophosphas.</i>	0.2 Gm.....	grs. iii.....	Hematinic.
MANGANESE HYPOPHOSPHITE..... <i>Mangani Hypophosphis.</i>	0.2 Gm.....	grs. iii.....	Hematinic.
MATRICARIA..... <i>Matricaria.</i>	15 Gm.....	ʒ iv.....	"Tonic."
MENADIONE..... <i>Menadionum.</i>	1 mg.....	gr. 1/60.....	Blood coagulant.
MENADIONE TABLETS..... <i>Tabellae Menadioni.</i>	1 mg.....	gr. 1/60.....	Blood coagulant.
MENADIONE SODIUM BISULFATE..... <i>Menadioni Sodii Bisulfis.</i>	2 mg.....	gr. 1/60.....	Blood coagulant.
MERCURIC IODIDE, RED..... <i>Hydrargyri Iodidum Rubrum.</i>	4 mg.....	gr. 1/6.....	Antiluetic.
MERCURIC IODIDE, RED, TABLETS..... <i>Tabellae Hydrargyri Iodidi Rubri.</i>	4 mg.....	gr. 1/6.....	Antiluetic.
MERCURIC SALICYLATE..... <i>Hydrargyri Salicylas.</i>	0.1 Gm.....	grs. iss.....	Antiluetic.
MERCURIC SUCCINIMIDE..... <i>Hydrargyri Succinimidum.</i>	15 mg.....	gr. 1/4.....	Antiluetic.
MERCURIC SUCCINIMIDE AMPULS..... <i>Ampullae Hydrargyri Succinimidi.</i>	15 mg.....	gr. 1/4.....	Antiluetic.
MERCUROUS CHLORIDE, MILD AND SODIUM BICARBONATE TABLETS..... <i>Tabellae Hydrargyri Chloride Mitis et Sodii Bicarbonatis.</i>	60 mg.....	gr. i.....	Cathartic.
MERCUROUS CHLORIDE PILLS, MILD, COMPOUND..... <i>Pilulae Hydrargyri Chloridi Mitis Compositae.</i>	2 pills <sup>46</sup> .....	.....	Cathartic.

<sup>43</sup> Laxative—15 cc.

<sup>44</sup> Laxative—8 Gm.

<sup>45</sup> Laxative—4 Gm.

<sup>46</sup> Compound Colocynth Extract—0.16 Gm.; Mild Mercurous Chloride—0.12 Gm.; Jalap Resin—40 mg.; Gamboge—30 mg.

English name and Latin title	Metric dose	Apothecary dose	Action or use
MERCUROUS CHLORIDE, MILD TABLETS. <i>Tabellae Hydrargyri Chloridi Mitis.</i>	60 mg.----	gr. i.-----	Cathartic.
MERCUROUS IODIDE, YELLOW. <i>Hydrargyri Iodidum Flavum.</i>	10 mg.----	gr. ⅓-----	Antiluetic.
MERCUROUS IODIDE TABLETS, YELLOW. <i>Tabellae Hydrargyri Iodidi Flavi.</i>	10 mg.----	gr. ⅓-----	Antiluetic.
MERCURY MASS. <i>Massa Hydrargyri.</i>	0.2 Gm.----	grs. iii-----	Cathartic.
MERCURY WITH CHALK. <i>Hydrargyrum cum Creta.</i>	0.25 Gm.----	grs. iv-----	Laxative; Antiluetic.
MERSALYL AND THEOPHYLLIN INJECTION. <i>Injectio Mersalylis et Theophyllinae.</i>	( <sup>47</sup> )	-----	Diuretic.
METHACHOLINE CHLORIDE. <i>Methacholinae Chloridum.</i>	0.2 Gm.----	grs. iii-----	Vascular antispasmodic.
METHACHOLINE CHLORIDE CAPSULES. <i>Capsulae Methacholi Chloridi.</i>	0.2 Gm.----	grs. iii-----	Vascular antispasmodic.
METHACHOLINE CHLORIDE INJECTION. <i>Injectio Methacholinae Chloridi.</i>	10 mg.----	gr. ⅓-----	Vascular antispasmodic.
METHENAMINE. <i>Methenamina.</i>	0.5 Gm.----	grs. viiiss-----	Urinary antiseptic.
METHENAMINE TABLETS. <i>Tabellae Methenaminae.</i>	0.5 Gm.----	grs. viiiss-----	Urinary antiseptic.
METHENAMINE AMPULS. <i>Ampullae Methenaminae.</i>	2 Gm. <sup>48</sup> ----	grs. xxx-----	Urinary antiseptic.
METHENAMINE AND SODIUM BIPHOSPHATE TABLETS. <i>Tabellae Methenaminae et Sodii Biphosphate.</i>	0.3 Gm. <sup>49</sup> ----	grs. v-----	Urinary acidifier.
METHYLENE BLUE. <i>Coeruleum Methylenum.</i>	0.15 Gm.----	grs. liiss-----	Urinary antiseptic.
METHYLROSANILINE CHLORIDE. <i>Methylrosanilinae Chloridum.</i>	6p mg.----	gr. i.-----	Antiseptic; Anthelmintic.
METHYLTESTOSTERONE. <i>Methyltestosteronum.</i>	10 mg. <sup>50</sup> ----	gr. ⅓-----	Testicular hormone.
METHYLTESTOSTERONE TABLETS. <i>Tabellae Methyltestosteroni.</i>	10 mg. <sup>50</sup> ----	gr. ⅓-----	Testicular hormone.
MEZEREUM. <i>Mezereum.</i>	0.6 Gm.----	grs. x-----	Antiluetic irritant.
MORPHINE INJECTION. <i>Injectio Morphinae.</i>	10 mg.----	gr. ⅓-----	Analgesic; Hypnotic.
MORPHINE HYDROCHLORIDE. <i>Morphinae Hydrochloridum.</i>	8 mg.----	gr. ⅓-----	Analgesic; Hypnotic.
MORPHINE SULPHATE. <i>Morphinae Sulfas.</i>	10 mg.----	gr. ⅓-----	Analgesic; Hypnotic.
MORPHINE SULFATE TABLETS. <i>Tabellae Morphinae Sulfatis.</i>	10 mg.----	gr. ⅓-----	Analgesic; Hypnotic.
MORPHINE AND ATROPINE SULFATES TABLETS. <i>Tabellae Morphinae et Atropinae Sulfatum.</i>	( <sup>51</sup> )	-----	Antisialagogue; Hypnotic.
MUSTARD, BLACK. <i>Sinapis Nigra.</i>	10 Gm.----	℥ liiss-----	Irritant; Emetic.
MYRRH TINCTURE. <i>Tinctura Myrrhae.</i>	2 cc.-----	℥ xxx-----	Carminative.
NEOARSPHENAMINE. <i>Neoarsphenamina.</i>	0.45 Gm.----	grs. vii-----	Antiluetic.
NEOCINCHOPHEN. <i>Neocinchophenu.</i>	0.3 Gm.----	grs. v-----	Analgesic.
NEOCINCHOPHEN TABLETS. <i>Tabellae Neocinchopheni.</i>	0.3 Gm.----	grs. v-----	Analgesic.

<sup>47</sup> Mersalyl—0.2 Gm.; Theophyllin—0.1 Gm.

<sup>48</sup> One of the few examples of a parenteral dose larger than an oral dose.

<sup>49</sup> 0.3 Gm. each of Methenamine and Sodium Biphosphate.

<sup>50</sup> Oral dosage; sublingual—5 mg.

<sup>51</sup> Morphine Sulfate—15 mg. (gr. ⅓); Atropine Sulfate—0.4 mg. (gr. ⅓<sub>100</sub>).

English name and Latin title	Metric dose	Apothecary dose	Action or use
<b>NEOSTIGMINE BROMIDE</b> <i>Neostigminae Bromidum.</i>	15 mg.----	gr. ¼-----	Motor stimulant.
<b>NEOSTIGMINE BROMIDE TABLETS.</b> <i>Tabellae Neostigminae Bromidi.</i>	15 mg.----	gr. ¼-----	Motor stimulant.
<b>NEOSTIGMINE METHYLSULFATE</b> <i>Neostigminae Methylsulfas.</i>	0.5 mg.----	gr. ¼ <sup>20</sup> ----	Motor stimulant.
<b>NEOSTIGMINE METHYLSULFATE INJECTION.</b> <i>Injectio Neostigminae Methylsulfatis.</i>	0.5 mg.----	gr. ¼ <sup>20</sup> ----	Motor stimulant.
<b>NICOTINAMIDE</b> <i>Nicotinamidum.</i>	25 mg.----	gr. ¾-----	Specific; Antipellegra.
<b>NICOTINAMIDE INJECTION</b> <i>Injectio Nicotinamidi.</i>	100 mg.----	grs. iss-----	Specific; Antipellegra.
<b>NICOTINAMIDE TABLETS</b> <i>Tabellae Nicotinamidi.</i>	25 mg.----	gr. ¾-----	Specific; Antipellegra.
<b>NICOTINIC ACID</b> <i>Acidum Nicotinicum.</i>	25 mg.----	gr. ¾-----	Specific; Antipellegra.
<b>NICOTINIC ACID TABLETS</b> <i>Tabellae Acidi Nicotini.</i>	25 mg.----	gr. ¾-----	Specific; Antipellegra.
<b>NITROHYDROCHLORIC ACID</b> <i>Acidum Nitrohydrochloricum.</i>	0.2 cc.----	℥ iii-----	Liver therapy.
<b>NITROHYDROCHLORIC ACID, DILUTED</b> <i>Acidum Nitrohydrochloricum Dilutum.</i>	1 cc.-----	℥ xv-----	Liver therapy.
<b>NUX VOMICA EXTRACT</b> <i>Extractum Nucis Vomicae.</i>	15 mg.----	gr. ¼-----	Bitter; Stomachic.
<b>NUX VOMICA FLUIDEXTRACT</b> <i>Fluidextractum Nucis Vomicae.</i>	0.1 cc.----	℥ iss-----	Bitter; Stomachic.
<b>NUX VOMICA TINCTURE</b> <i>Tinctura Nucis Vomicae.</i>	1 cc.-----	℥ xv-----	Bitter; Stomachic.
<b>OLEOVITAMIN A AND D</b> <i>Oleovitamina A et D.</i>	8 cc.-----	f℥ ii-----	Vitamin therapy.
<b>OPIUM AND GLYCYRRHIZA MIXTURE, COMPOUND.</b> <i>Mistura Opii et Glycyrrhizae Composita.</i>	4 cc. <sup>53</sup> ----	f℥ i-----	Expectorant.
<b>OPIUM EXTRACT</b> <i>Extractum Opii.</i>	30 mg.----	gr. ss-----	Analgesic; Hypnotic.
<b>OPIUM GRANULATED</b> <i>Opium Granulatum.</i>	60 mg.----	gr. i-----	Analgesic; Hypnotic.
<b>OPIUM POWDERED</b> <i>Opium Pulveratum.</i>	60 mg.----	gr. i-----	Analgesic; Hypnotic.
<b>OPIUM TINCTURE</b> <i>Tinctura Opii.</i>	0.6 cc.----	℥ x-----	Analgesic; Hypnotic.
<b>OPIUM TINCTURE, CAMPHORATED.</b> <i>Tinctura Opii Camphorata.</i>	4 cc.-----	f℥ ii-----	Mild anodyne.
<b>ORANGE, BITTER, OIL</b> <i>Oleum Aurantii Amari.</i>	0.1 cc.----	℥ iss-----	Flavor.
<b>OUABAIN</b> <i>Ouabainum.</i>	0.25 mg.----	gr. ½ <sup>80</sup> ----	Cardiac stimulant.
<b>OUABAIN INJECTION</b> <i>Injectio Ouabaini.</i>	0.25 mg.----	gr. ½ <sup>80</sup> ----	Cardiac stimulant.
<b>OX BILE EXTRACT</b> <i>Extractum Fellis Bovis.</i>	0.3 Gm.----	grs. v-----	Laxative.
<b>OX BILE EXTRACT TABLETS</b> <i>Tabellae Extracti Fellis Bovis.</i>	0.3 Gm.----	grs. v-----	Laxative.
<b>OXOPHENARSINE HYDROCHLORIDE.</b> <i>Oxophenarsinae Hydrochloridum.</i>	45 mg.----	gr. ¾-----	Antiluetic.
<b>PAMAQUINE NAPHTHOATE</b> <i>Pamaquinæ Naphthoas.</i>	20 mg.----	gr. ¼-----	Antimalarial.
<b>PANCREATIN</b> <i>Pancreatinum.</i>	0.5 Gm.----	grs. viiss-----	Predigestion of Protein and Starch.
<b>PAPAVERINE HYDROCHLORIDE</b> <i>Papaverinae Hydrochloridum.</i>	0.1 Gm.----	grs. iss-----	Antispasmodic.
<b>PAPAVERINE HYDROCHLORIDE INJECTION.</b> <i>Injectio Papaverinae Hydrochloridi.</i>	0.1 Gm.----	grs. iss-----	Antispasmodic.

<sup>53</sup> Antimony and Potassium Tartrate—0.96 mg.; Camphorated Opium Tincture—0.48 cc.; Ethyl Nitrite Spirit—0.12 cc.

English name and Latin title	Metric dose	Apothecary dose	Action or use
<b>PARALDEHYDE</b> ----- <i>Paraldehydum.</i>	4 cc.-----	f3 i-----	Hypnotic.
<b>PARATHYROID INJECTION</b> ----- <i>Injectio Parathyroidet.</i>	(58)-----		Thyroid therapy.
<b>PELLETIERINE TANNATE</b> ----- <i>Pelletierinae Tannas.</i>	0.25 Gm.---	grs. iv.---	Anthelmintic; Tenia- fuge.
<b>PENICILLIN CALCIUM</b> ----- <i>Penicillinum Calcicum.</i>	(54)-----		Antibiotic.
<b>PENICILLIN SODIUM</b> ----- <i>Penicillinum Sodicum.</i>	(54)-----		Antibiotic.
<b>PENICILLIN DENTAL CONES</b> ----- <i>Denticoni Penicillini.</i>	(55)-----		Antibiotic.
<b>PENICILLIN INJECTION IN OIL AND WAX.</b> ----- <i>Injectio Penicillin in Oleo et Cera.</i>	(56)-----		Antibiotic.
<b>PENICILLIN TABLETS</b> ----- <i>Tabellae Penicillini.</i>	(57)-----		Antibiotic.
<b>PENICILLIN TROCHES</b> ----- <i>Trochisci Penicillini.</i>	(58)-----		Antibiotic.
<b>PENTOBARBITAL ELIXIR</b> ----- <i>Elixir Pentobarbitali.</i>	4 cc. <sup>59</sup> -----	f3 i-----	Sedative.
<b>PENTOBARBITAL SODIUM</b> ----- <i>Pentobarbitalum Sodicum.</i>	0.1 Gm.---	grs. iss---	Sedative.
<b>PENTOBARBITAL SODIUM CAP- SULES.</b> ----- <i>Capsulae Pentobarbitali Sodici.</i>	0.1 Gm.---	grs. iss---	Sedative.
<b>PENTOBARBITAL SODIUM TAB- LETS.</b> ----- <i>Tabellae Pentobarbitali Sodici.</i>	0.1 Gm.---	grs. iss---	Sedative.
<b>PEPPERMINT SPIRIT</b> ----- <i>Spiritus Menthae Piperitae.</i>	1 cc.-----	℥ xv-----	Carminative.
<b>PEPSIN</b> ----- <i>Pepsinum.</i>	0.5 Gm.---	grs. viiss---	Digestant.
<b>PEPSIN AND RENNIN ELIXIR</b> ----- <i>Elixir Pepsini et Rennini.</i>	8 cc. <sup>60</sup> -----	f3 ii-----	Digestant.
<b>PEPSIN ELIXIR</b> ----- <i>Elixir Pepsini.</i>	8 cc. <sup>61</sup> -----	f3 ii-----	Digestant.
<b>PEPSIN ELIXIR, COMPOUND</b> ----- <i>Elixir Pepsini Compositum.</i>	8 cc. <sup>61</sup> -----	f3 ii-----	Digestant.
<b>PEPSIN, SACCHARATED</b> ----- <i>Pepsinum Saccharatum.</i>	1 Gm. <sup>62</sup> -----	grs. xv-----	Digestant.
<b>PETROLATUM, LIQUID</b> ----- <i>Petrolatum Liquidum.</i>	15 cc.-----	f3 iv-----	Emollient.
<b>PETROLATUM, LIQUID, EMUL- SION.</b> ----- <i>Emulsum Petrolati Liquidi.</i>	30 cc.-----	f3 i-----	Lubricant.
<b>PETROLATUM, LIQUID, EMULSION WITH PHENOLPHTHALEIN.</b> -----	15 cc. <sup>63</sup> -----	f3 iv-----	Laxative.
<b>PHENOBARBITAL</b> ----- <i>Phenobarbitalum.</i>	30 mg.-----	gr. ss.-----	Hypnotic.
<b>PHENOBARBITAL ELIXIR</b> ----- <i>Elixir Phenobarbitali.</i>	4 cc.-----	f3 i-----	Hypnotic.
<b>PHENOBARBITAL TABLETS</b> ----- <i>Tabellae Phenobarbitali.</i>	30 mg.-----	gr. ss.-----	Hypnotic.
<b>PHENOBARBITAL SODIUM</b> ----- <i>Phenobarbitalum Sodicum.</i>	30 mg.-----	gr. ss.-----	Hypnotic.
<b>PHENOBARBITAL SODIUM TAB- LETS.</b> ----- <i>Tabellae Phenobarbitali Sodici.</i>	30 mg.-----	gr. ss.-----	Hypnotic.

<sup>53</sup> 25 U. S. P. Units.

<sup>54</sup> Oral, on fasting stomach—300,000 units; Intramuscular—300,000 units.

<sup>55</sup> 1 cone.

<sup>56</sup> 300,000 units.

<sup>57</sup> On a fasting stomach—300,000 units.

<sup>58</sup> 1 troche.

<sup>59</sup> Pentobarbital—14.5 mg.

<sup>60</sup> Pepsin—0.18 Gm.; Rennin—0.14 Gm.

<sup>61</sup> Pepsin—0.18 Gm.

<sup>62</sup> Pepsin—0.1 Gm.

<sup>63</sup> Liquid Petrolatum—7.5 cc.; Phenolphthalein—60 mg.

English name and Latin title	Metric dose	Apothecary dose	Action or use
<b>PHENOLPHTHALEIN</b> ..... <i>Phenolphthalein.</i>	60 mg.....	gr. i.....	Cathartic.
<b>PHENOLPHTHALEIN TABLETS</b> ..... <i>Tabellae Phenolphthaleini.</i>	60 mg.....	gr. i.....	Cathartic.
<b>PHENOLSULFONPHTHALEIN INJECTION.</b> <i>Injectio Phenolsulfonphthaleini.</i>	6 mg.....	gr. ⅞o.....	Diagnostic.
<b>PHENYL SALICYLATE</b> ..... <i>Phenylis Salicylas.</i>	0.3 Gm.....	grs. v.....	Intestinal antiseptic.
<b>PHENYL SALICYLATE TABLETS</b> ..... <i>Tabellae Phenylis Salicylatis.</i>	0.3 Gm.....	grs. v.....	Intestinal antiseptic.
<b>PHYSTIGMINE SALICYLATE</b> ..... <i>Phystigminae Salicylas.</i>	2 mg.....	gr. ⅞o.....	Parasympathetic stimulant.
<b>PILOCARPINE HYDROCHLORIDE</b> ..... <i>Pilocarpinae Hydrochloridum.</i>	5 mg.....	gr. ⅞2.....	Sudorific.
<b>PILOCARPINE NITRATE</b> ..... <i>Pilocarpinae Nitrus.</i>	5 mg.....	gr. ⅞2.....	Sudorific.
<b>PIMENTA OIL</b> ..... <i>Oleum Pimentae.</i>	0.1 cc.....	℥ iss.....	Carminative.
<b>PINE TAR SYRUP</b> ..... <i>Syrupus Picis Pini.</i>	10 cc.....	f℥ iiss.....	Expectorant.
<b>PITUITARY, POSTERIOR, INJECTION.</b> <i>Injectio Pituitarii Posterioris.</i>	1 cc.....	℥ xv.....	Ecboic; Antidiuretic.
<b>PLAGUE VACCINE</b> ..... <i>Vaccinum Pestis.</i>	( <sup>64</sup> ).....		Prophylaxis.
<b>PLANTAGO SEED</b> ..... <i>Plantaginis Semen.</i>	.75 Gm.....	℥ i.....	Laxative.
<b>PLASMA, CITRATED NORMAL HUMAN.</b> <i>Plasma Humanum Normale Citratum.</i>	500 cc.....		Antishock.
<b>PODOPHYLLUM RESIN</b> ..... <i>Resina Podophylli.</i>	10 mg.....	gr. ⅞.....	Cathartic.
<b>POPLAR BUD</b> ..... <i>Populi Gemma.</i>	4 Gm.....	grs. Lx.....	Diuretic.
<b>POTASSIUM ACETATE</b> ..... <i>Potassii Acetas.</i>	1 Gm.....	grs. xv.....	Diuretic.
<b>POTASSIUM ARSENITE SOLUTION.</b> <i>Liquor Potassii Arsenitis.</i>	0.2 cc.....	℥ iii.....	Alterative.
<b>POTASSIUM BITARTRATE</b> ..... <i>Potassii Bitartras.</i>	2 Gm.....	grs. xxx.....	Diuretic; Laxative.
<b>POTASSIUM BROMIDE</b> ..... <i>Potassii Bromidum.</i>	1 Gm.....	grs. xv.....	Sedative.
<b>POTASSIUM BROMIDE ELIXIR</b> ..... <i>Elixir Potassii Bromidi.</i>	4 cc. <sup>65</sup> .....	f℥ i.....	Sedative.
<b>POTASSIUM CHLORIDE TABLETS</b> ..... <i>Tabellae Potassii Chloridi.</i>	1 Gm.....	grs. xv.....	Diuretic.
<b>POTASSIUM CITRATE</b> ..... <i>Potassii Citras.</i>	1 Gm.....	grs. xv.....	Diuretic; Laxative.
<b>POTASSIUM CITRATE EFFERVESCENT.</b> <i>Potassii Citras Effervescens.</i>	4 Gm.....	grs. Lx.....	Diuretic; Laxative.
<b>POTASSIUM CITRATE SOLUTION.</b> <i>Liquor Potassii Citratis.</i>	15 cc.....	f℥ iv.....	Diuretic; Laxative.
<b>POTASSIUM GUAIACOLSULFONATE</b> ..... <i>Potassii Guaiacolsulfonas.</i>	0.5 Gm.....	grs. viiss.....	Intestinal antiseptic.
<b>POTASSIUM GUAIACOLSULFONATE SYRUP.</b> <i>Syrupus Potassii Guaiacolsulfonatis.</i>	4 cc. <sup>66</sup> .....	f℥ i.....	Intestinal antiseptic.
<b>POTASSIUM HYDROXIDE SOLUTION</b> ..... <i>Liquor Potassii Hydraxidi.</i>	1 cc. <sup>67</sup> .....	℥ xv.....	Antacid.
<b>POTASSIUM HYPOPHOSPHITE</b> ..... <i>Potassii Hypophosphis.</i>	0.5 Gm.....	grs. viiss.....	"Nerve food."

<sup>64</sup> For active immunization, 0.5 cc. and 1 cc. with a 7 to 10 days' interval, the latter dose preferably to be repeated once.

<sup>65</sup> Potassium Bromide—0.7 Gm.

<sup>66</sup> Potassium Guaiacolsulfonate—0.3 Gm.

<sup>67</sup> Should be freely diluted with water before being taken into the mouth.

English name and Latin title	Metric dose	Apothecary dose	Action or use
<b>POTASSIUM IODIDE</b> ..... <i>Potassii Iodidum.</i>	0.3 Gm....	grs. v.....	Expectorant; Diuretic.
<b>POTASSIUM IODIDE SOLUTION</b> ..... <i>Liquor Potassii Iodidi.</i>	0.3 cc.....	℥ v.....	Expectorant; Diuretic.
<b>POTASSIUM IODIDE TABLETS</b> ..... <i>Tabellae Potassii Iodidi.</i>	0.3 Gm....	grs. v.....	Expectorant; Diuretic.
<b>POTASSIUM NITRATE</b> ..... <i>Potassii Nitræs.</i>	1 Gm.....	grs. xv.....	Diuretic.
<b>POTASSIUM SODIUM TARTRATE</b> ..... <i>Potassii Sodii Tartras.</i>	10 Gm....	ʒ iiss.....	Cathartic.
<b>POTASSIUM THIOCYANATE</b> ..... <i>Potassii Thiocyanas.</i>	0.3 Gm....	grs. v.....	Hypotensor.
<b>PROCAINE HYDROCHLORIDE AMPULS</b> ..... <i>Ampullae Procinas Hydrochloridi.</i>	20 mg.....	gr. ⅓.....	Local anesthetic.
<b>PROCAINE HYDROCHLORIDE SOLUTION</b> ..... <i>Liquor Procinas Hydrochloridi.</i>	1 cc.....	℥ xv.....	Local anesthetic.
<b>PROCAINE HYDROCHLORIDE TABLETS</b> ..... <i>Tabellae Procinas Hydrochloridi.</i>	50 mg.....	gr. ¾.....	Local anesthetic.
<b>PROGESTERONE</b> ..... <i>Progesteronum.</i>	5 mg.....	gr. ⅓.....	Antibabortient.
<b>QUASSIA</b> ..... <i>Quassia.</i>	0.5 Gm....	grs. viiss.....	Stomachic.
<b>QUINACRINE HYDROCHLORIDE</b> ..... <i>Quinacrinæ Hydrochloridum.</i>	0.1 Gm....	grs. iss.....	Antimalarial.
<b>QUINACRINE HYDROCHLORIDE TABLETS</b> ..... <i>Tabellae Quinacrinæ Hydrochloridi.</i>	0.1 Gm....	grs. iss.....	Antimalarial.
<b>QUINIDINE SULFATE</b> ..... <i>Quinidinæ Sulfas.</i>	0.2 Gm....	grs. iii.....	Antimalarial.
<b>QUINIDINE SULFATE TABLETS</b> ..... <i>Tabellae Quinidinæ Sulfatis.</i>	0.2 Gm....	grs. iii.....	Antimalarial.
<b>QUININE</b> ..... <i>Quinina.</i>	1 Gm.....	grs. xv.....	Bitter tonic; Antimalarial Antipyretic.
<b>QUININE AND UREA HYDROCHLORIDE AMPULS</b> ..... <i>Ampullae Quininae et Ureas Hydrochloridi.</i>	0.5 Gm....	grs. viiss.....	Antimalarial; Antipyretic.
<b>QUININE BISULFATE</b> ..... <i>Quininae Bisulfas.</i>	1 Gm.....	grs. xv.....	Antimalarial.
<b>QUININE DIHYDROCHLORIDE</b> ..... <i>Quininae Dihydrochloridum.</i>	1 Gm.....	grs. xv.....	Antimalarial.
<b>QUININE DIHYDROCHLORIDE AMPULS</b> ..... <i>Ampullae Quininae Dihydrochloridi.</i>	0.5 Gm....	grs. viiss.....	Antimalarial.
<b>QUININE ETHYLCARBONATE</b> ..... <i>Quininae Aethylcarbonas.</i>	1 Gm.....	grs. xv.....	Antimalarial.
<b>QUININE HYDROBROMIDE</b> ..... <i>Quininae Hydrobromidum.</i>	0.3 Gm....	grs. v.....	Antimalarial.
<b>QUININE HYDROCHLORIDE</b> ..... <i>Quininae Hydrochloridum.</i>	0.6 Gm. <sup>68</sup> ...	grs. x.....	Antimalarial.
<b>QUININE PHOSPHATE</b> ..... <i>Quininae Phosphas.</i>	0.3 Gm....	grs. v.....	Antimalarial.
<b>QUININE SALICYLATE</b> ..... <i>Quininae Salicylas.</i>	0.3 Gm....	grs. v.....	Antimalarial.
<b>QUININE SULFATE</b> ..... <i>Quininae Sulfas.</i>	0.6 Gm....	grs. x.....	Antimalarial.
<b>QUININE SULFATE CAPSULES</b> ..... <i>Capsulae Quininae Sulfatis.</i>	0.6 Gm....	grs. x.....	Antimalarial.
<b>QUININE SULFATE TABLETS</b> ..... <i>Tabellae Quininae Sulfatis.</i>	0.6 Gm....	grs. x.....	Antimalarial.
<b>RHUBARB AND SODA MIXTURE</b> ..... <i>Mistura Rhei et Sodæ.</i>	4 cc. <sup>69</sup> ...	ʒ 3 i.....	Laxative.
<b>RHUBARB ELIXIR, ALKALINE</b> ..... <i>Elixir Rhei Alkalinum.</i>	4 cc. <sup>70</sup> ...	ʒ 3 i.....	Laxative.

<sup>68</sup> Intramuscularly—0.2 Gm.

<sup>69</sup> Rhubarb Fluidextract—0.06 cc.; Ipecac Fluidextract—0.012 cc.; Sodium Bicarbonate—0.14 Gm.; Peppermint Spirit—0.14 cc.

<sup>70</sup> Rhubarb Fluidextract—0.064 cc.; Hydrastis Fluidextract—0.032 cc.; Potassium Carbonate—64 mg.

English name and Latin title	Metric dose	Apothecary dose	Action or use
<b>RHUBARB EXTRACT</b> ..... <i>Extractum Rhei.</i>	0.5 Gm.	grs. viiss.	Laxative.
<b>RHUBARB FLUIDEXTRACT</b> ..... <i>Fluidextractum Rhei.</i>	1 cc.	℥ xv.	Laxative.
<b>RHUBARB POWDER, COMPOUND</b> ..... <i>Pulvis Rhei Compositus.</i>	2 Gm. <sup>71</sup>	grs. xxx.	Laxative.
<b>RHUBARB SYRUP</b> ..... <i>Syrupus Rhei.</i>	10 cc.	f℥ iiss.	Laxative.
<b>RHUBARB SYRUP, AROMATIC</b> ..... <i>Syrupus Rhei Aromaticus.</i>	10 cc.	f℥ iiss.	Laxative.
<b>RHUBARB TINCTURE</b> ..... <i>Tinctura Rhei.</i>	4 cc.	f℥ i.	Laxative.
<b>RHUBARB TINCTURE, SWEET</b> ..... <i>Tinctura Rhei Dulcis.</i>	4 cc.	f℥ i.	Laxative.
<b>RICE POLISHINGS EXTRACT</b> ..... <i>Extractum Perpolitionum.</i>	8 cc.	f℥ ii.	Vitamin B therapy.
<b>SALICIN</b> ..... <i>Salicinum.</i>	1 Gm.	grs. xv.	Simple bitter.
<b>SALVIA</b> ..... <i>Salvia.</i>	4 Gm.	grs. Lx.	Bitter aromatic.
<b>SANGUINARIA</b> ..... <i>Sanguinaria.</i>	0.125 Gm.	grs. ii.	Expectorant.
<b>SANTAL OIL</b> ..... <i>Oleum Santali.</i>	0.5 cc.	℥ viii.	Urinary disinfectant.
<b>SANTONIN</b> ..... <i>Santoninum.</i>	60 mg.	gr. i.	Anthelmintic.
<b>SANTONIN AND MILD MERCUROUS CHLORIDE TABLETS</b> ..... <i>Tabellae Santonini et Hydrargyri Chloridi Mitis.</i>	( <sup>72</sup> )		Irrational; anthelmintic; cathartic.
<b>SANTONIN TABLETS</b> ..... <i>Tabellae Santonini.</i>	60 mg.	gr. i.	Anthelmintic.
<b>SASSAFRAS</b> ..... <i>Sassafras.</i>	10 Gm.	℥ iiss.	Carminative.
<b>SCOPOLAMINE HYDROBROMIDE</b> ..... <i>Scopolaminae Hydrobromidum.</i>	0.5 mg.	gr. ¼ <sup>20</sup>	Somnifacient.
<b>SCOPOLAMINE HYDROBROMIDE TABLETS</b> ..... <i>Tabellae Scopolaminae Hydrobromidi.</i>	0.6 mg.	gr. ¼ <sup>20</sup>	Somnifacient.
<b>SENEGA</b> ..... <i>Senega.</i>	1 Gm.	grs. xv.	Nauseant expectorant.
<b>SENEGA FLUIDEXTRACT</b> ..... <i>Fluidextractum Senegae.</i>	1 cc.	℥ xv.	Nauseant expectorant.
<b>SENEGA SYRUP</b> ..... <i>Syrupus Senegae.</i>	4 cc.	f℥ i.	Nauseant expectorant.
<b>SENNA</b> ..... <i>Senna.</i>	2 Gm.	f℥ i.	Cathartic.
<b>SENNA FLUIDEXTRACT</b> ..... <i>Fluidextractum Sennae.</i>	2 cc.	℥ xxx.	Cathartic.
<b>SENNA POWDER, COMPOUND</b> ..... <i>Pulvis Sennae Compositus.</i>	4 Gm. <sup>73</sup>	℥ i.	Cathartic.
<b>SENNA SYRUP</b> ..... <i>Syrupus Sennae.</i>	8 cc.	f℥ ii.	Cathartic.
<b>SERENOA</b> ..... <i>Serenoa.</i>	1 Gm.	grs. xv.	Irrational diuretic.
<b>SERENOA AND SANDALWOOD ELIXIR, COMPOUND</b> ..... <i>Elixir Serenoe et Santali Compositum.</i>	4 cc. <sup>74</sup>	f℥ i.	Irrational diuretic.
<b>SERENOA FLUIDEXTRACT</b> ..... <i>Fluidextractum Serenoe.</i>	1 cc.	℥ xv.	Irrational diuretic.
<b>SERPENTARIA</b> ..... <i>Serpentaria.</i>	1 Gm.	grs. xv.	Bitter.
<b>SERUM, ANTIMENINGOCOCCIC</b> ..... <i>Serum Antimeningococcicum.</i>	20 cc.	f℥ v.	Antimeningococcic.

<sup>71</sup> Rhubarb—0.5 Gm.; Magnesium Oxide—1.3 Gm.; Ginger—0.2 Gm.

<sup>72</sup> Santonin—60 mg.; Mild Mercurous Chloride—0.12 Gm.

<sup>73</sup> Senna—0.72 Gm.; Glycyrrhiza—0.94 Gm.; Washed Sulfur—0.32 Gm.; Fennel Oil—0.016 cc.

<sup>74</sup> Serenoa Fluidextract—1 cc.; Zea Fluidextract—1 cc.

English name and Latin title	Metric dose	Apothecary dose	Action or use
SERUM, HUMAN MEASLES IMMUNE..... <i>Serum Immune Morbilliosi Humanum.</i>	(76)	-----	Prophylaxis.
SERUM, HUMAN SCARLET FEVER IMMUNE. <i>Serum Immune Scarlatinae Humanum.</i>	(76)	-----	Prophylaxis.
SERUM, NORMAL HUMAN..... <i>Serum Humanum Normale.</i>	500 cc.---	⊙ i.---	Antishock.
SODIUM ACETATE..... <i>Sodii Acetas.</i>	1.5 Gm.---	grs. xxii.---	Diuretic.
SODIUM ARSENATE, EXSICCATED..... <i>Sodii Arsenas Exsiccatus.</i>	3 mg.---	gr. ½a.---	Alterative.
SODIUM ARSENATE, SOLUTION..... <i>Liquor Sodii Arsenatis.</i>	0.2 cc. <sup>76</sup> ---	℥ iii.---	Alterative.
SODIUM ASCORBATE INJECTION..... <i>Injectio Sodii Ascorbatis.</i>	0.1 Gm.---	grs. iss.---	Vitamin C therapy.
SODIUM BICARBONATE..... <i>Sodii Bicarbonas.</i>	2 Gm.---	grs. xxx.---	Antacid.
SODIUM BICARBONATE AND CALCIUM CARBONATE POWDER. <i>Ulois Sodii Bicarbonatis et Calcii Carbonatis.</i>	2.6 Gm.---	grs. xL.---	Antacid.
SODIUM BICARBONATE AND CALCIUM CARBONATE TABLETS. <i>Tabellae Sodii Bicarbonatis et Calcii Carbonatis.</i>	2.6 Gm.---	grs. xL.---	Antacid.
SODIUM BICARBONATE AND MAGNESIUM OXIDE POWDER. <i>Pulvis Sodii Bicarbonatis et Magnesi Oxidi.</i>	1.3 Gm.---	grs. ss.---	Antacid.
SODIUM BICARBONATE AND MAGNESIUM OXIDE TABLETS. <i>Tabellae Sodii Bicarbonatis et Magnesi Oxidi.</i>	1.3 Gm.---	grs. ss.---	Antacid.
SODIUM BICARBONATE TABLETS. <i>Tabellae Sodii Bicarbonatis.</i>	1 Gm.---	grs. xv.---	Antacid.
SODIUM BIPHOSPHATE..... <i>Sodii Biphosphas.</i>	0.6 Gm.---	grs. x.---	Urinary acidifier.
SODIUM BROMIDE..... <i>Sodii Bromidum.</i>	1 Gm.---	grs. xv.---	Sedative.
SODIUM BROMIDE ELIXIR..... <i>Elixir Sodii Bromidi.</i>	4 cc. <sup>77</sup> ---	f℥ i.---	Sedative.
SODIUM BROMIDE TABLETS. <i>Tabellae Sodii Bromidi.</i>	1 Gm.---	grs. xv.---	Sedative.
SODIUM CACODYLATE..... <i>Sodii Cacodylas.</i>	60 mg.---	grs. i.---	Alterative.
SODIUM CACODYLATE AMPULS..... <i>Ampullae Sodii Cacodylatis.</i>	0.3 Gm. <sup>78</sup> ---	grs. v.---	Alterative.
SODIUM CITRATE..... <i>Sodii Citras.</i>	1 Gm.---	grs. xv.---	Diuretic.
SODIUM CITRATE SOLUTION. <i>Liquor Sodii Citratis.</i>	15 cc. <sup>79</sup> ---	f℥ i.---	Diuretic.
SODIUM GLYCEROPHOSPHATE..... <i>Sodii Glycerophosphas.</i>	0.25 Gm.---	grs. iv.---	Nerve tonic.
SODIUM HYPOPHOSPHITE..... <i>Sodii Hypophosphis.</i>	0.5 Gm.---	grs. viiss.---	Nerve tonic.
SODIUM IODIDE..... <i>Sodii Iodidum.</i>	0.3 Gm.---	grs. v.---	Alterative.
SODIUM INDIGOTINDISULFONATE..... <i>Sodii Indigotindisulfonas.</i>	( <sup>80</sup> )-----	-----	Diagnostic.
SODIUM INDIGOTINDISULFONATE AMPULS. <i>Ampullae Sodii Indigotindisulfonatis.</i>	( <sup>80</sup> )-----	-----	Diagnostic.

<sup>75</sup> Therapeutic—20 cc.; Prophylactic—10 cc.

<sup>76</sup> Exsiccated Sodium Arsenate—2 mg.

<sup>77</sup> Sodium Bromide—0.7 Gm.

<sup>78</sup> This is one of the rare instances when a hypodermic dose is greater than an oral dose. After oral ingestion, inorganic arsenic is likely to be freed rapidly, by the action of the acid gastric juice and serious poisoning can result from ingesting an amount that would be perfectly safe to inject. (Goodman and Gilman, The Pharmacological Basis of Therapeutics—1941.)

<sup>79</sup> Sodium Citrate—0.4 Gm.

<sup>80</sup> Subcutaneously and Intramuscularly—50 mg.; Intravenously—8 mg.

English name and Latin title	Metric dose	Apothecary dose	Action or use
SODIUM IODIDE AMPULS. <i>Ampullae Sodii Iodidi.</i>	1 Gm.	grs. xv.	Alterative.
SODIUM NITRITE. <i>Sodii Nitris.</i>	60 mg.	gr. i.	Vasodilator.
SODIUM NITRITE TABLETS. <i>Tabellae Sodii Nitritis.</i>	60 mg.	gr. i.	Vasodilator.
SODIUM PHOSPHATE. <i>Sodii Phosphas.</i>	4 Gm.	℥ i.	Saline cathartic.
SODIUM PHOSPHATE, EFFERVESCENT. <i>Sodii Phosphas Effervescens.</i>	10 Gm.	℥ iiss.	Saline cathartic.
SODIUM PHOSPHATE, EXSICCATED. <i>Sodii Phosphas Exsiccatus.</i>	2 Gm.	℥ ss.	Saline cathartic.
SODIUM PHOSPHATE SOLUTION. <i>Liquor Sodii Phosphatis.</i>	8 cc.	℥℥ ii.	Saline cathartic.
SODIUM SALICYLATE. <i>Sodii Salicylas.</i>	1 Gm.	grs. xv.	Antirheumatic.
SODIUM SALICYLATE TABLETS. <i>Tabellae Sodii Salicylatis.</i>	1 Gm.	grs. xv.	Antirheumatic.
SODIUM SALICYLATE AMPULS. <i>Ampullae Sodii Salicylatis.</i>	1 Gm.	grs. xv.	Antirheumatic.
SODIUM SALICYLATE AND GELSEMIUM ELIXIR, COMPOUND. <i>Elixir Sodii Salicylatis et Gelsemii Compositum.</i>	4 cc. <sup>61</sup>	℥℥ i.	Antirheumatic.
SODIUM SALICYLATE AND IODINE AMPULS. <i>Ampullae Sodii Salicylatis et Iodidi.</i>	( <sup>62</sup> )	-----	Antirheumatic.
SODIUM SALICYLATE AND IODIDE WITH COLCHICINE AMPULS. <i>Ampullae Sodii Salicylatis et Iodidi cum Colchicina.</i>	( <sup>63</sup> )	-----	Antirheumatic.
SODIUM SALICYLATE ELIXIR. <i>Elixir Sodii Salicylatis.</i>	4 cc.	℥℥ i.	Antirheumatic.
SODIUM SULFATE. <i>Sodii Sulfas.</i>	15 Gm.	℥ iv.	Saline cathartic.
SODIUM THIOCYANATE. <i>Sodii Thiocyanas.</i>	0.3 Gm.	grs. v.	Hypotensor.
SODIUM THIOCYANATE ELIXIR. <i>Elixir Sodii Thiocyanatis.</i>	4 cc.	℥℥ i.	Hypotensor.
SODIUM THIOSULFATE. <i>Sodii Thiosulfas.</i>	1 Gm.	grs. xv.	Cathartic.
SODIUM THIOSULFATE AMPULS. <i>Ampullae Sodii Thiosulfatis.</i>	1 Gm.	grs. xv.	Cathartic; Cyanide antidote.
SPARTEINE SULFATE. <i>Sparteinae Sulfas.</i>	30 mg.	grs. ss.	Cardiac depressant.
SPEARMINT SPIRIT. <i>Spiritus Menthae Viridis.</i>	1 cc.	℥ xv.	Carminative.
SQUILL FLUIDEXTRACT. <i>Fluidextract m Scillae.</i>	0.1 cc.	℥ iss.	Expectorant.
SQUILL SYRUP. <i>Syrupus Scillae.</i>	2 cc.	℥℥ ssy.	Expectorant.
SQUILL SYRUP, COMPOUND. <i>Syrupus Scillae Compositus.</i>	2 cc.	℥℥ ss.	Expectorant.
SQUILL VINEGAR. <i>Acetum Scillae.</i>	1 cc.	℥ xv.	Expectorant.
STIBOPHEN. <i>Stibophenum.</i>	0.2 Gm.	grs. iiii.	Anthelmintic.
STIBOPHEN AMPULS. <i>Ampullae Stibopheni.</i>	0.2 Gm.	grs. iiii.	Anthelmintic.
STOMACH, POWDERED. <i>Stomachus Pulveratus.</i>	( <sup>64</sup> )	-----	Hematinic.
STRAMONIUM CAPSULES. <i>Capsulae Stramonii.</i>	75 mg.	grs. 1¼.	Antispasmodic.

<sup>61</sup> Sodium Salicylate—0.32 Gm.; Potassium Iodide—60 mg.; Cimicifuga Fluidextract—0.128 cc.; Gelsemium Fluid extract—0.064 cc.

<sup>62</sup> Sodium Salicylate—1 Gm.; Sodium Iodide—1 Gm.

<sup>63</sup> Sodium Salicylate—1 Gm.; Sodium Iodide—1 Gm.; Colchicine—0.65 mg.

<sup>64</sup> 1 U. S. P. unit daily.

English name and Latin title	Metric dose	Apothecary dose	Action or use
<b>STRAMONIUM EXTRACT</b> ..... <i>Extractum Stramonii.</i>	20 mg. ....	gr. ¼.....	Antispasmodic.
<b>STRAMONIUM FLUIDEXTRACT</b> ..... <i>Fluidextractum Stramonii.</i>	0.075 cc. ....	℥ 1¼.....	Antispasmodic.
<b>STRAMONIUM TINCTURE</b> ..... <i>Tinctura Stramonii.</i>	0.75 cc. ....	℥ xii.....	Antispasmodic.
<b>STRONTIUM BROMIDE</b> ..... <i>Strontii Bromidum.</i>	1 Gm. ....	grs. xv.....	Sedative.
<b>STRONTIUM SALICYLATE</b> ..... <i>Strontii Salicylas.</i>	1 Gm. ....	grs. xv.....	Antirheumatic.
<b>STROPHANTHIN</b> ..... <i>Strophanthinum.</i>	0.5 mg. ....	gr. ½20.....	Cardiac stimulant.
<b>STROPHANTHIN AMPULS</b> ..... <i>Ampullae Strophanthini.</i>	0.5 mg. ....	gr. ½20.....	Cardiac stimulant.
<b>STROPHANTHUS</b> ..... <i>Strophanthus.</i>	60 mg. ....	gr. i.....	Cardiac stimulant.
<b>STROPHANTHUS TINCTURE</b> ..... <i>Tinctura Strophanthi.</i>	0.5 cc. ....	℥ viii.....	Cardiac stimulant.
<b>STRYCHNINE</b> ..... <i>Strychnina.</i>	1.5 mg. ....	gr. ¼0.....	Central nervous system; Stimulant.
<b>STRYCHNINE NITRATE</b> ..... <i>Strychninae Nitras.</i>	2 mg. ....	gr. ¼0.....	Central nervous system; Stimulant.
<b>STRYCHNINE NITRATE TABLETS</b> ..... <i>Tabellae Strychninae Nitratis.</i>	2 mg. ....	gr. ¼0.....	Central nervous system; Stimulant.
<b>STRYCHNINE PHOSPHATE</b> ..... <i>Strychninae Phosphas.</i>	2 mg. ....	gr. ¼0.....	Central nervous system; Stimulant.
<b>STRYCHNINE SULFATE</b> ..... <i>Strychninae Sulfas.</i>	2 mg. ....	gr. ¼0.....	Central nervous system; Stimulant.
<b>STRYCHNINE SULFATE TABLETS</b> ..... <i>Tabellae Strychninae Sulfatis.</i>	2 mg. ....	gr. ¼0.....	Central nervous system; Stimulant.
<b>SUCCINYL SULFATHIAZOLE</b> ..... <i>Succinylsulfathiazolum.</i>	2 Gm. ....	grs. xxx.....	Intestinal bacteriostatic.
<b>SUCCINYL SULFATHIAZOLE TABLETS</b> ..... <i>Tabellae Succinylsulfathiazoli.</i>	2 Gm. ....	grs. xxx.....	Intestinal bacteriostatic.
<b>SULFADIAZINE</b> ..... <i>Sulfadiazinum.</i>	2 Gm. ....	grs. xxx.....	Bacteriostatic.
<b>SULFADIAZINE TABLETS</b> ..... <i>Tabellae Sulfadiazini.</i>	2 Gm. ....	grs. xxx.....	Bacteriostatic.
<b>SULFADIAZINE SODIUM</b> ..... <i>Sulfadiazinum Sodicum.</i>	2 Gm. ....	grs. xxx.....	Bacteriostatic.
<b>SULFADIAZINE SODIUM, STERILE</b> ..... <i>Sulfadiazinum Sodicum Sterile.</i>	2 Gm. ....	grs. xxx.....	Bacteriostatic.
<b>SULFAGUANIDINE</b> ..... <i>Sulfaguanidinum.</i>	2 Gm. ....	grs. xxx.....	Intestinal bacteriostatic.
<b>SULFAGUANIDINE TABLETS</b> ..... <i>Tabellae Sulfaguanidini.</i>	2 Gm. ....	grs. xxx.....	Intestinal bacteriostatic.
<b>SULFAMERAZINE</b> ..... <i>Sulfamerazinum.</i>	2 Gm. ....	grs. xxx.....	Bacteriostatic.
<b>SULFAMERAZINE TABLETS</b> ..... <i>Tabellae Sulfamerazini.</i>	2 Gm. ....	grs. xxx.....	Bacteriostatic.
<b>SULFAMERAZINE SODIUM, STERILE</b> ..... <i>Sulfamerazinum Sodicum Sterile.</i>	2 Gm. ....	grs. xxx.....	Bacteriostatic.
<b>SULFANILAMIDE</b> ..... <i>Sulfanilamidum.</i>	2 Gm. ....	grs. xxx.....	Bacteriostatic.
<b>SULFANILAMIDE TABLETS</b> ..... <i>Tabellae Sulfanilamidi.</i>	2 Gm. ....	grs. xxx.....	Bacteriostatic.
<b>SULFAPYRIDINE</b> ..... <i>Sulfapyridinum.</i>	2 Gm. ....	grs. xxx.....	Bacteriostatic.
<b>SULFAPYRIDINE SODIUM, STERILE</b> ..... <i>Sulfapyridinum Sodicum Sterile.</i>	2 Gm. ....	grs. xxx.....	Bacteriostatic.
<b>SULFAPYRIDINE TABLETS</b> ..... <i>Tabellae Sulfapyridini.</i>	2 Gm. ....	grs. xxx.....	Bacteriostatic.
<b>SULFARSPHENAMINE</b> ..... <i>Sulfarsphenamina.</i>	0.45 Gm. ....	grs. vii.....	Bacteriostatic.
<b>SULFATHIAZOLE</b> ..... <i>Sulfathiazolum.</i>	2 Gm. ....	grs. xxx.....	Bacteriostatic.
<b>SULFATHIAZOLE TABLETS</b> ..... <i>Tabellae Sulfathiazoli.</i>	2 Gm. ....	grs. xxx.....	Bacteriostatic.

English name and Latin title	Metric dose	Apothecary dose	Action or use
<b>SULFATHIAZOLE SODIUM</b> ..... <i>Sulfathiazolum Sodicum.</i>	2 Gm.....	grs. xxx.....	Bacteriostatic.
<b>SULFATHIAZOLE SODIUM, STERILE.</b> <i>Sulfathiazolum Sodicum Sterile.</i>	2 Gm.....	grs. xxx.....	Bacteriostatic.
<b>SULFOBROMOPHTHALEIN SODIUM INJECTION.</b> <i>Injectio SulFOBromophthaleini Sodici.</i>	( <sup>85</sup> ).....	.....	Liver function test.
<b>SULFONETHYLMETHANE.</b> <i>Sulfonethylmethanum.</i>	0.75 Gm.....	grs. xli.....	Hypnotic.
<b>SULFONMETHANE.</b> <i>Sulfonmethanum.</i>	0.75 Gm.....	grs. xli.....	Hypnotic; Sedative.
<b>SULFUR, PRECIPITATED.</b> <i>Sulfur Praecipitatum.</i>	4 Gm.....	℥ i.....	Mild cathartic.
<b>SULFUR, WASHED.</b> <i>Sulfur Lotum.</i>	4 Gm.....	℥ i.....	Mild cathartic.
<b>SURAMIN SODIUM.</b> <i>Suraminum Sodicum.</i>	1 Gm.....	grs. xv.....	Prophylaxis (trypanosomiasis).
<b>TARAXACUM.</b> <i>Taraxacum.</i>	4 Gm.....	℥ i.....	Tonic; Laxative.
<b>TARAXACUM FLUIDEXTRACT.</b> <i>Fluidextractum Tarazaci.</i>	4 Gm.....	℥ i.....	Tonic; Laxative.
<b>TERPIN HYDRATE AND CODEINE ELIXIR.</b> <i>Elixir Terpini Hydratis et Codeinae.</i>	4 cc. <sup>86</sup> .....	f℥ i.....	Antiseptic; Diuretic; Expectorant.
<b>TERPIN HYDRATE ELIXIR.</b> <i>Elixir Terpini Hydratis.</i>	4 cc.....	f℥ i.....	Antiseptic; Diuretic; Expectorant.
<b>TESTOSTERONE PROPIONATE.</b> <i>Testosteroni Propionas.</i>	25 mg.....	gr. ¾.....	Testicular hormone therapy.
<b>TETANUS ANTITOXIN.</b> <i>Antitoxinum Tetanicum.</i>	( <sup>87</sup> ).....	.....	Prophylaxis (tetanus).
<b>TETANUS TOXOID.</b> <i>Toxoidum Tetanicum.</i>	( <sup>88</sup> ).....	.....	Active immunity (tetanus).
<b>TETANUS TOXOID, ALUM PRECIPITATED.</b> <i>Toxoidum Tetanicum Alumen-praecipitatum.</i>	( <sup>89</sup> ).....	.....	Active immunity (tetanus).
<b>TETRACHLOROETHYLENE.</b> <i>Tetrachloroethylenum.</i>	3 cc.....	℥ xLv.....	Anesthetic; Anthelmintic.
<b>TETRACHLOROETHYLENE CAPSULES.</b> <i>Capsulae Tetrachloroethyleni.</i>	3 cc.....	℥ xLv.....	Anthelmintic.
<b>THEOBROMINE AND SODIUM ACETATE.</b> <i>Theobromina et Sodium Acetate.</i>	0.5 Gm.....	grs. viiiss.....	Diuretic.
<b>THEOBROMINE AND SODIUM CAPSULES.</b> <i>Capsulae Theobrominae et Sodii Acetatis.</i>	0.5 Gm.....	grs. viiiss.....	Diuretic.
<b>THEOBROMINE AND SODIUM SALICYLATE.</b> <i>Theobromina et Sodii Salicylas.</i>	1 Gm.....	grs. xv.....	Diuretic.
<b>THEOPHYLLINE.</b> <i>Theophyllina.</i>	0.2 Gm.....	grs. iiii.....	Diuretic.
<b>THEOPHYLLINE AND SODIUM ACETATE.</b> <i>Theophyllina et Sodii Acetas.</i>	0.2 Gm.....	grs. iiii.....	Diuretic.
<b>THEOPHYLLINE AND SODIUM ACETATE TABLETS.</b> <i>Tabellae Theophyllinae et Sodii Acetatis.</i>	0.2 Gm.....	grs. iiii.....	Diuretic.
<b>THIAMINE HYDROCHLORIDE.</b> <i>Thiaminae Hydrochloridum.</i>	5 mg.....	gr. ⅛.....	Vitamin B <sub>1</sub> therapy.
<b>THYMOL.</b> <i>Thymol.</i>	2 Gm. <sup>90</sup> .....	grs. xxx.....	Anthelmintic.

<sup>85</sup> For each kilogram of body weight—2 mg.

<sup>86</sup> Terpin Hydrate—68 mg.; Codeine—8 mg.

<sup>87</sup> Therapeutic—20,000 units; Prophylactic—1,500 units.

<sup>88</sup> 1 cc. or 0.5 cc. (whichever is specified on the label) to be repeated twice at intervals of approximately 3 weeks.

<sup>89</sup> Same as Tetanus Toxoid with one repeated dose between 4 and 6 weeks.

<sup>90</sup> Divided into 3 doses.

English name and Latin title	Metric dose	Apothecary dose	Action or use
<b>THYME</b> ..... <i>Thymus</i> .	4 Gm	℥ i	Diaphoretic.
<b>THYME FLUIDEXTRACT</b> ..... <i>Fluidextractum Thymi</i> .	4 cc	f℥ i	Diaphoretic.
<b>THYME OIL</b> ..... <i>Oleum Thymi</i> .	0.1 cc	℥ iss	Carminative.
<b>THYROID</b> ..... <i>Thyroideum</i> .	60 mg	gr. i	Thyroid therapy.
<b>THYROID TABLETS</b> ..... <i>Tabellae Thyroidei</i> .	60 mg	gr. i	Thyroid therapy.
<b>THYROXIN</b> ..... <i>Thyroxinum</i> .	0.5 mg	gr. 1/20	Thyroid therapy.
<b>TOLU BALSAM TINCTURE</b> ..... <i>Tinctura Balsami Tolutani</i> .	2 cc	℥ xxx	Expectorant.
<b>TOTAQUINE</b> ..... <i>Totaquina</i> .	0.6 Gm	grs. x	Antimalarial.
<b>TOTAQUINE CAPSULES</b> ..... <i>Capsulae Totaquinae</i> .	0.6 Gm	grs. x	Antimalarial.
<b>TOTAQUINE TABLETS</b> ..... <i>Tabellae Totaquinae</i> .	0.6 Gm	grs. x	Antimalarial.
<b>TRIBROMOETHANOL</b> ..... <i>Tribromoethanol</i> .	( <sup>91</sup> )		Anesthetic.
<b>TRIBROMOETHANOL SOLUTION</b> ..... <i>Liquor Tribromoethanolis</i> .	( <sup>92</sup> )		Anesthetic.
<b>TRICHLOROETHYLENE</b> ..... <i>Trichloroethylenum</i> .	1 cc. <sup>(93)</sup>	℥ xv	Anesthetic.
<b>TRITICUM FLUIDEXTRACT</b> ..... <i>Fluidextractum Tritici</i> .	10 cc	f℥ iiss	Diuretic.
<b>TRYPARSAMIDE</b> ..... <i>Tryparsamidum</i> .	2 Gm	grs. xxx	Antileretic.
<b>TUBERCULIN, OLD</b> ..... <i>Tuberculinum Pristinum</i> .	( <sup>94</sup> )		Diagnostic.
<b>TUBERCULIN, PURIFIED PROTEIN DERIVATIVE</b> ..... <i>Tuberculini Derivatium Proteinicum Purificatum</i> .	( <sup>95</sup> )		Diagnostic.
<b>TURPENTINE OIL EMULSION</b> ..... <i>Emulsum Oleo Terebinthinae</i> .	2 cc	℥ xxx	Anthelmintic; Diuretic.
<b>TYPHOID AND PARATYPHOID VACCINE</b> ..... <i>Vaccinum Typhosum et Paratyphosum</i> .	( <sup>96</sup> )		Immunity (typhoid and paratyphoid).
<b>TYPHOID VACCINE</b> ..... <i>Vaccinum Typhosum</i> .	( <sup>96</sup> )		Immunity (typhoid).
<b>TYPHUS VACCINE, EPIDEMIC</b> ..... <i>Vaccinum Typhusum Epidemicum</i> .	( <sup>97</sup> )		Immunization Prophylaxis.
<b>UREA</b> ..... <i>Urea</i> .	8 Gm	℥ iil	Diuretic.
<b>UVA URSI FLUIDEXTRACT</b> ..... <i>Fluidextractum Uvae Ursi</i> .	2 cc	℥ xxx	Diuretic.
<b>VALERIAN</b> ..... <i>Valeriana</i> .	0.75 Gm	grs. xii	Antispasmodic.
<b>VALERIAN FLUIDEXTRACT</b> ..... <i>Fluidextractum Valerianae</i> .	1 cc	℥ xv	Antispasmodic.
<b>VALERIAN TINCTURE</b> ..... <i>Tinctura Valerianae</i> .	4 cc	f℥ i	Antispasmodic.
<b>VALERIAN TINCTURE, AMMONIATED</b> ..... <i>Tinctura Valerianae Ammoniatata</i> .	2 cc	℥ xxx	Antispasmodic.

<sup>91</sup> Rectal—for each kilogram of body weight—60 mg. CAUTION—The total amount administered should not exceed 8 Gm. for women or 10 Gm. for men, regardless of body weight.

<sup>92</sup> Rectal—for each kilogram of body weight—0.06 cc. CAUTION—The total amount administered should not exceed 8 cc. for women or 10 cc. for men, regardless of body weight.

<sup>93</sup> Inhalation.

<sup>94</sup> Diagnostic, intracutaneous—0.000,01 to 0.001 cc. Therapeutic, subcutaneous—0.000,000,01 to 0.000,001 cc.

<sup>95</sup> Diagnostic—0.000,02 mg. or 0.005 mg.

<sup>96</sup> For active immunization—0.5 and 1 cc., the latter dose to be repeated once.

<sup>97</sup> For active immunization—1.0 cc., to be repeated once or twice with 7- to 10-day intervals. (A booster dose every 6 months is recommended when real danger of infection prevails.)

English name and Latin title	Metric dose	Apothecary dose	Action or use
VERATRUM VIRIDE..... <i>Veratrum Viride.</i>	0.1 Gm.....	grs. iss.....	Cardiac depressant.
VERATRUM VIRIDE TINCTURE..... <i>Tinctura Veratri Viridis.</i>	1 cc.....	℥ xv.....	Cardiac depressant.
VIBURNUM OPULUS..... <i>Viburnum Opulus.</i>	4 Gm.....	℥ i.....	Tonic; Alterative.
VIBURNUM PRUNIFOLIUM..... <i>Viburnum Prunifolium.</i>	4 Gm.....	℥ i.....	Uterine sedative.
VIBURNUM PRUNIFOLIUM ELIXIR..... <i>Elixir Viburni Prunifolii.</i>	4 cc.....	f℥ i.....	Uterine sedative.
VIBURNUM PRUNIFOLIUM FLUIDEXTRACT. <i>Fluidextractum Viburni Prunifolii.</i>	4 cc.....	f℥ i.....	Uterine sedative.
WHITE PINE..... <i>Pinus Alba.</i>	2 Gm.....	℥ ss.....	Expectorant.
WHITE PINE SYRUP, COMPOUND..... <i>Syrupus Pini Albae Compositus.</i>	4 cc.....	f℥ i.....	Expectorant.
WHITE PINE SYRUP, COMPOUND, WITH CODEINE. <i>Syrupus Pini Albae Compositus cum Codeina.</i>	4 cc.....	f℥ i.....	Expectorant.
YELLOW FEVER VACCINE..... <i>Vaccinum Febris Flavae.</i>	0.5 cc.....	℥ viiss.....	Immunization.
ZEAL..... <i>Zea.</i>	4 Gm.....	℥ i.....	Diuretic.
ZEAL FLUIDEXTRACT..... <i>Fluidextractum Zeae.</i>	4 cc.....	f℥ i.....	Diuretic.
ZINC PHENOLSULFONATE..... <i>Zinci Phenosulfonas.</i>	0.125 Gm.....	grs. ii.....	Astringent; Emetic.

## NOTES

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## POISONING

Any substance which, without acting mechanically, causes a disturbance of the body functions, injury, disease, or death, when applied to, or introduced into the body, is a poison. Many substances are capable of producing death but are not classed as poisons. Powdered glass, needles, or other similar foreign bodies, may cause death, but their action is mechanical.

All drugs listed as poisons are also used in medicine in the treatment of disease. A drug is a medicine when the dose given produces a therapeutic effect. It is a poison when the dose given or the amount taken causes sickness, disease, or death. A drug, therefore, has a therapeutic or poisonous action, according to the amount taken.

The maximum dose is the largest quantity of a drug that can be given without producing poisonous effects. The toxic dose is the quantity which will produce poisonous effects. The lethal or fatal dose is the quantity which causes death. The fatal dose of a given drug for man is the smallest dose known to have caused death.

The study of the science which treats of the nature, properties, effects, identification, and antidotal treatment of poisons is called toxicology.

Poisoning may occur in many ways:

1. Suicidal intent.
2. Homicidal intent.
3. Mistake—taking a quantity of one drug when another was intended.
4. Overdose.
5. Error in writing a prescription.
6. Error in compounding a prescription.
7. Continuous use of cumulative poisons.
8. Inhalation of poisonous gases.
9. Spilling of corrosive substance on a part of the body or as a result of an explosion.
10. Exposure to poisonous materials used industrially.
11. Continuous use of habit-forming drugs.
12. Bites of rabid animals, poisonous snakes, and insects.
13. Eating of partly decomposed or infected foods.
14. Result of an injury and subsequent contamination.
15. Poisonous effects of certain diseases.
16. Frequent use of potent medicines and certain nostrums (proprietary compounds).

## ***Types of Poisoning***

*Acute poisoning* is caused by taking a toxic or lethal dose of a poison or smaller doses at short intervals. The acute symptoms are caused by rapid absorption of the drug by the blood and thereby impairs or stops its normal function.

*Chronic poisoning* is caused by taking, inhaling or absorbing through the skin for an extended period, small doses of cumulative poison, which produce progressive deterioration of tissue or function. Cumulative poisons are eliminated more slowly than they are absorbed.

## ***Action of Poisons***

The activity of a poison is dependent on:

1. *Physical state.* Gases, liquids and solids are absorbed and act more quickly in that order. All insolubles are nonpoisonous.
2. *Channel of absorption.* The rapidity of absorption and effectiveness occur in the following order:
  - a. Inhalation.
  - b. Intravenous injection.
  - c. Intramuscular injection.
  - d. Orally.
  - e. Application to the skin surface.
3. *Amount taken.* Action is usually more severe in large doses, because more of the poison is absorbed in a shorter period of time.
4. *Body weight.* In general, the more a person weighs, the larger the amount required to cause poisoning.
5. *Age.* Infants, young children and the aged react to smaller doses of drugs and poisons than the average young adult.
6. *Idiosyncrasy.* Many persons are highly sensitive to the action of certain drugs, poisons and foods. Often a therapeutic dose produces toxic effects.
7. *Habit.* Drug addicts can take doses of habit-forming drugs, which would prove fatal to the average individual.
8. *Natural tolerance.* Some persons show a natural resistance to the action of certain drugs.
9. *Heath.* Persons suffering from kidney diseases are very susceptible to the action of drugs, because elimination is retarded and the poison accumulates in the blood and tissues.
10. *Time of administration.* Poisons taken when the stomach is full will absorb more slowly than when taken on an empty stomach.

## ***Symptoms of Poisoning***

Poisoning is indicated if the person:

1. Suffers intense pain.
2. Becomes delirious.
3. Sinks into a stupor.
4. Has convulsions, or

5. Vomits freely after taking a drug or food, provided, however, the symptoms are not caused by a disease. The symptoms vary with the amount of drug taken and absorbed and with the length of time the poison has been in the system. Most poisons exhibit three stages but some, such as anesthetics, exhibit four degrees or stages of poisonings.

### ***Stages of Poisoning***

*First degree.* This period is of very brief duration. If a person is observed in this stage, it is usually easy to perceive the nature of the poison and the necessity for prompt action. The antidotes at this stage are mechanical and chemical, because much of the poison still remains within the stomach. The chemical antidotes are dissolved in the "wash-water," used in flushing out the stomach.

*Second degree.* This period produces marked symptoms which indicate the true nature of the poison. Physiologic antidotes or antagonists should first be used in this stage. They should be administered frequently in small doses, to avoid poisoning by an overdose of the antidote. The value of physiological antidotes depends on their producing an opposite effect on the system to that of the poison. Mechanical and chemical antidotes should be used following physiologic antidotes, because some of the poison still may be in the stomach or intestines.

*Third degree.* The poison produces, at this stage its full effects upon the system. The vital organs are depressed, often to the point of ceasing to function, and death occurs. Physiologic antidotes and measures are used during this stage. Often, the symptoms succeed each other so rapidly that the stage is difficult to recognize; therefore it is necessary to treat the symptoms as they arise in order to prevent death.

### ***Diagnosis of Poisoning***

The diagnosing of poisoning is difficult because many poisons develop symptoms resembling those of disease and because few poisons exhibit symptoms sufficiently characteristic to identify the poison, positively. Some physical aids to diagnosis include:

1. Corrosion, swelling and bleaching of the skin, mouth and throat, indicates poisoning by caustic acids, alkalies, phenols and metallic salts.

2. The color of the stain produced may aid in identifying the poison—Iodine stains the skin and mucous membranes black; bromine stains dark brown; nitric and picric acid stain yellow; and phenol bleaches the skin.

3. A distinctive odor is imparted to the breath by creosote, phenol, ether, chloroform, oil of bitter almonds and alcohol. In phosphorous poisoning the odor resembles garlic.

4. The urine is colored dark green by phenol, salol, creosote and resorcinol; red by antipyrine and trionol (after long use); brown or black by pyrogallol; yellow by picric acid; bright yellow by santonin, which changes to scarlet on addition of a caustic alkali.

5. In the gastrointestinal tract, corrosives and irritants produce nausea and vomiting.

6. Respiration is labored in most forms of acute poisoning.

7. The pulse is quick and feeble in acute poisoning due to shock.

8. The body temperature is lowered by quinine, acetanilid, and salicylates.

9. Motor disturbances are caused by strychnine, which overstimulates the motor nerves, causing convulsions; lead paralyzes the muscles of the hands, causing wristdrop; conium paralyzes nerve endings and muscles, causing muscular paralysis.

10. The pupils of the eye are contracted to pinpoints by morphine; atropine dilates the pupils; santonin and digitalis give "yellow" vision; and methyl alcohol causes blindness.

11. A ringing sensation in the ears is caused by quinine; salicylates cause a buzzing; and strychnine increases sensitivity to sound.

12. The teeth become loosened, sometimes falling out and the gums are inflamed and ulcerated in chronic mercury poisoning.

13. The salivary glands are overstimulated by continued use of mercury salts or by gradual absorption of mercury by factory workers.

14. The skin is affected by aconite—first a tingling sensation; second, numbness; and finally, anesthesia. Nitrates dilate the skin capillaries, causing redness. Silver salts cause black blotches. Iodides cause a skin rash. In chronic arsenic poisoning, pus forms in the sudoriferous glands and arsenic is deposited in the nails, skin and hair forming dark brown or black deposits resembling freckles.

15. The cerebrum is affected by chronic cocaine and alcohol poisoning, which cause severe psychic disturbances: first, there is hallucination; this stage is followed by delusions. Narcotics cause stupor and coma; cannabis and opium, when smoked, produce pleasurable hallucinations. The continued use of all these drugs results in mania.

16. The heart muscles are paralyzed by aconite, chloral hydrate, acetanilid, phenacetin, antipyrine, and nicotine.

*Be careful when dispensing drugs to see that the right drug in the correct amount is issued. In using solutions for the eye, ear, nose, throat, urethra, rectum or any body opening be sure that the proper strength is employed and that the temperature of the solution is appropriate. Particular caution should be taken with eye drops both as to the solution used and the strength and the temperature at which it is employed.*

## Antidotes

An antidote is any measure or agent that will remove, prevent the absorption of or counteract the physiologic effects of poisons. In three classes they are:

1. Mechanical.
2. Chemical.
3. Physiological.

### *Acetanilid*

Empty stomach with tube; Loosen clothing; Inhalator or artificial respiration if necessary to combat cyanosis; Keep the patient warm; Stimulants—Aromatic Spirits of Ammonia  $f\bar{3}$  i or whisky  $f\bar{3}$  iv or brandy  $f\bar{3}$  iv or hypodermic atropine, strychnine or digitalin.

### *Acetone*

Give emetic, stimulants; combat collapse, keep the patient awake.

### *Acids, Mineral*

DO NOT USE STOMACH TUBE OR EMETICS

Give milk of magnesia or magnesium oxide immediately to neutralize the poison. Carbonates are inferior because of gas produced; Demulcents of mucilaginous substances.

In cases of strong sulfuric acid, give water (ice cold) because of heat of dilution. Give ice to relieve thirst and pain.

For pain—morphine  $\frac{1}{4}$  grain or tincture of opium  $\mathfrak{M}$  x to xv or hypo of morphine. Stimulant—enema of citrated caffeine grains v or hypodermic of atropine, strychnine or digitalin.

### *Aconite and Aconitine*

Stomach tube or emetic or mustard or zinc sulfate or apomorphine; Recumbent position with head lower than body, do not allow patient to arise, even to vomit; Give compound solution of iodine  $\mathfrak{M}$  xx or tannic acid grains xxx in water  $f\bar{3}$ ; Stimulants—aromatic spirits of ammonia, whisky or brandy or hypodermic of atropine; tincture of digitalis  $\mathfrak{M}$  xxx orally; artificial respiration, if necessary.

### *Alcohol, Ethyl (Ethanol)*

Stomach tube or emetic of mustard or zinc sulfate; Keep body warm and head cold, giving alternating hot and cold douches; Stimulant—Citrated caffeine grains iii or hypodermic of strychnine; To overcome stupor—aromatic spirits of ammonia  $f\bar{3}$  i in water; Respiratory stimulant—Inhalations of amyl nitrite or ammonia.

### *Alcohol, Wood (Methanol)*

Irrigate stomach with a solution of sodium citrate grains x to  $f\bar{3}$  or sodium bicarbonate; Or emetics; Magnesium sulfate  $f\bar{3}$  ss; Inhale vapor of acetic acid or camphor; Milk, white of egg, flour and water paste; Pilocarpine hydrochloride  $\frac{1}{8}$  to  $\frac{1}{2}$  grain to cause perspiration; Stimulants—enema of citrated caffeine grains v to combat collapse, hypodermic of atropine, strychnine or digitalin; Artificial respiration if necessary; Subsequent treatment—sodium bicarbonate grains viiss every 2 or 3 hours for acidosis; Hot packs to facilitate profuse perspiration; Keep bowels open for several days; Inhalation of ammonia.

### *Alkalies, Caustic*

DO NOT USE STOMACH TUBE OR EMETICS.

Assist vomiting with tepid water; Give a weak acid (as 5 percent acetic or 2 percent citric or 2 percent tartaric) until alkali is neutralized; Give vegetable oils to form soaps (not mineral oil or "boiled" linseed oil); Stimulants to combat collapse, enema of citrated caffeine grains v or hypodermic of strychnine or atropine or digitalin; In cases of ammonia poisoning where edema threatens life, tracheotomy should be immediately performed by the physician.

## ***Alkaloids***

Give the alkaloidal precipitant first; Tannic acid grains xxx in  $f\text{℥}$  of water or compound solution of iodine  $\text{℥}$  xx in  $f\text{℥}$  i of water; Potassium permanganate grain i in  $f\text{℥}$  i of water for morphine or strychnine poisoning.

Stomach tube or emetic following the alkaloidal precipitation. This is particularly essential if iodine has been used.

## ***Almond, Bitter***

Stomach tube or emetic; Stimulants internal and external.

## ***Amidopyrine***

Same as Acetanelid.

## ***Aniline and Derivatives***

Empty stomach with tube; Administer 3 percent acetic acid for aniline; Loosen clothing; Inhalator or artificial respiration if necessary to combat cyanosis; Keep patient warm; Stimulants—aromatic spirit of ammonia  $f\text{℥}$  i or whisky  $f\text{℥}$  iv or brandy  $f\text{℥}$  iv or hypodermic of atropine or strychnine or digitalin.

## ***Antimony and Compounds***

Emetic of zinc sulfate or hypodermic of apomorphine; Tannic acid grains xxx in  $f\text{℥}$  iii of warm water; Demulcents—flaxseed tea or starch paste or white of egg or milk or gruel; Relieve pain if respiration is not enfeebled, with morphine  $\frac{1}{4}$  grain or tincture of opium  $\text{℥}$  x to xv. Keep patient warm by hot applications and in prone position with head low; Combat collapse by stimulants of citrated caffeine grains iii or whisky or brandy or hypodermic of atropine or strychnine or digitalin.

## ***Antipyrine***

Same as Aniline.

## ***Apomorphine***

Stomach tube; Heart stimulants; Respiratory stimulants.

## ***Apocynin***

Stomach tube or one of the following emetics if heart has not been affected: mustard or zinc sulfate or hypodermic of apomorphine; Tannic acid grains xxx to  $f\text{℥}$  i of water; Compound solution of iodine  $\text{℥}$  xx to  $f\text{℥}$  i of water; Evacuate stomach again; Magnesium sulfate  $\text{℥}$  i in plenty of water as a cathartic; Keep patient in recumbent position for several days to avoid fatal syncope; tincture of aconite  $\text{℥}$  v, tincture of opium  $\text{℥}$  x. Stimulants—aromatic spirit of ammonia  $f\text{℥}$  i or whisky or brandy  $f\text{℥}$  iv.

## ***Arsenic and Compounds***

Stomach tube if immediately available, otherwise emetic of mustard or zinc sulfate; magma of ferrie hydroxine U. S. P.  $f\text{℥}$  iv or sodium thiosulphate  $\text{℥}$  ss in  $f\text{℥}$  xvi water followed by grain xv doses t. i. d. for several days; Then castor oil  $f\text{℥}$  i to purge intestinal tract; demulcents—olive oil, gruel, starch, mucilage, eggs, milk, linseed tea, elm bark, mucilage, etc.; Keep patient warm—external stimulants; Internal stimulants—Whisky or brandy; For pain—tincture of opium  $\text{℥}$  x or hypodermic of morphine  $\frac{1}{8}$  to  $\frac{1}{4}$  grain.

## ***Aspidium***

Stomach tube or emetic; Magnesium sulfate,  $\text{℥}$  ss in  $f\text{℥}$  i water; Avoid alcohol, oils or fats; Demulcents, Barbitol grains v for convulsions; Stimulants—for collapse; Artificial respiration if necessary.

## ***Atropine***

Tannic acid grains xxx in  $f\frac{3}{4}$  i water or compound solution of iodine  $\mathfrak{M}$  xx in  $f\frac{3}{4}$  i water; evacuate stomach with stomach tube or emetic of mustard or zinc sulfate or hypo apomorphine; tincture of opium  $\mathfrak{M}$  x to xv to quiet excitement, also eserine  $\frac{1}{60}$  to  $\frac{1}{30}$  grains; Stimulants—citrate caffeine grains iii or whisky or brandy; Heat to extremities.

Alternate hot and cold douches to combat depression; Artificial respiration if necessary; Inhalation of ammonia.

## ***Barbital and all Barbituric Acid Derivatives***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine; Tannic acid grains xxx in  $f\frac{3}{4}$  i of water; Evacuate stomach again; Castor oil  $f\frac{3}{4}$  i; Enemas and diuretics; Citrated caffeine grains iii; Lukewarm baths with cold water to head; Morphine  $\frac{1}{4}$  grain to control excitement during recovery.

## ***Barium and Compounds***

Stomach tube or emetic of mustard or zinc sulfate; Aqueous solution of magnesium, sodium, or potassium sulfate, 10 percent; Demulcents of egg, milk, gruels, oil, etc.; For pain—tincture of opium  $\mathfrak{M}$  x or hypodermic of morphine; Stimulants—hypodermic of atropine or strychnine or digitalin.

## ***Belladonna***

Tannic acid grains xxx in  $f\frac{3}{4}$  i water or compound solution of iodine  $\mathfrak{M}$  xx in  $f\frac{3}{4}$  i water; Evacuate stomach with stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine; Tincture of opium  $\mathfrak{M}$  x to xv to quiet excitement, also eserine  $\frac{1}{60}$  to  $\frac{1}{30}$  grain; Stimulants—Citrated caffeine grains iii or whisky or brandy; Heat to extremities; Alternate hot and cold douches to combat depression; Artificial respiration if necessary; Inhalations of ammonia.

## ***Benzene***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine; Tincture of belladonna  $\mathfrak{M}$  xxx or hypodermic of atropine  $\frac{1}{60}$  grain; Hot and cold baths to chest; Artificial respiration if necessary.

## ***Black Hellebore***

Stomach tube or emetic; Heat to extremities; Artificial respiration if necessary; Stimulants—Citrated caffeine grains iii or hypodermic of atropine; Inhalations of amyl nitrite or ammonia.

## ***Bromides***

Stomach tube or emetic of apomorphine injection; Stimulants—citrate caffeine grains v to viiss; Morphine  $\frac{1}{4}$  grain to control mental effect; Cardiac stimulant—tincture of digitalis  $\mathfrak{M}$  xx.

## ***Bromine Solutions***

DO NOT USE STOMACH TUBE.

Starch and water paste; Emetic of mustard or zinc sulfate or hypodermic of apomorphine. Sodium bicarbonate solution, 10 percent freely; Demulcents; Stimulants to combat collapse; For Pain—tincture of opium  $\mathfrak{M}$  x or morphine hypodermically.

## ***Caffeine***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine; Stimulants; Atropine; Morphine.

## ***Camphor***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine; Castor oil  $f\text{ } \frac{3}{i}$  as purgative; Frequent doses of whiskey  $f\text{ } \frac{3}{i}$  or brandy  $f\text{ } \frac{3}{i}$  to combat convulsions; Inhalations of ether; Heat to extremities and alternating hot and cold douches.

## ***Cannabis***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine; Potassium permanganate grains ii to  $f\text{ } \frac{3}{xvi}$  water, or tannic acid grains xxx to  $f\text{ } \frac{3}{i}$  water; Evacuate stomach again; Atropine  $\frac{1}{20}$  grain or tincture of belladonna  $\text{m } x$  to  $xv$  every 15 minutes for three doses; Keep patient awake by citrated caffeine grains iii frequently and by walking, shaking, striking with towel, cold water to face, etc.; Inhalations of amyl nitrite; Artificial respiration if necessary.

## ***Cantharides or Cantharidin***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine; Demulcents—elm bark mucilage, flaxseed tea, gruel; For pain—morphine  $\frac{1}{4}$  grain or tincture of opium  $\text{m } x$ ; Stimulants—whisky or brandy  $f\text{ } \frac{3}{iv}$ ; Much water by mouth, catheterization and irrigate bladder with saturated solution of boric acid; Warm baths.

## ***Carbolic Acid***

Stomach tube if excessive damage to stomach mucosa has not occurred; Otherwise emetic of mustard or hypodermic of apomorphine; Do not administer alcohol in any form or oils, as it dissolves the poison and produces systemic effects; Sodium or magnesium sulfates; Demulcents—white of egg, milk, gruel, flaxseed tea, elm bark mucilage; Warmth to extremities; Inhalation of amyl nitrite; Hypodermic of stimulants of atropine, strychnine, or digitalin.

## ***Carbon Disulfide***

Stomach tube or emetic of mustard; Magnesium sulfate  $\frac{3}{i}$  in  $f\text{ } \frac{3}{iv}$  water; Chloral hydrate grains  $x$  and potassium bromide grains  $xx$ ; Stimulants—whisky or brandy  $f\text{ } \frac{3}{iv}$ ; Inhalations of ammonia; Heat to body and artificial respiration if necessary.

## ***Chloral Hydrate, Cloralamid***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine; Citrated caffeine in grain  $v$  to  $x$  doses by mouth or rectum; Hypodermic of strychnine  $\frac{1}{50}$  to  $\frac{1}{20}$  grain or atropine  $\frac{1}{60}$  grain, repeat in 15 minutes; Keep patient awake with head lower than feet, applying heat to body and limbs; Inhalations of amyl nitrite or ammonia.

## ***Chlorates***

Stomach tube or emetic; Give large quantity of water.

## ***Chlorine Solutions***

Ammonia water in  $f\text{ } \frac{3}{i}$  water; Emetic of mustard or zinc sulfate or hypodermic of apomorphine; Demulcents—milk, egg, flour, gruel; Sodium thiosulphate grains  $xx$  in  $f\text{ } \frac{3}{ii}$  water; Stimulants—hypodermic of atropine or strychnine or digitalin; For pain—tincture of opium  $\text{m } x$  or hypodermic of morphine.

## ***Chloroform***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine; Stimulate circulation with hypodermic of strychnine or  $\text{m } xxx$  of 10 percent camphor in olive oil; Avoid hypodermic injections of ether or alcohol; Artificial respiration if necessary; Inhalations of amyl nitrite or ammonia.

## ***Chromium and Compounds***

Emetic of mustard or zinc sulfate; Magnesium oxide or magnesium carbonate or sodium bicarbonate or calcium carbonate and water; Demulcents—milk, gruel, flaxseed tea, or elm bark mucilage, etc.; Stimulate and combat collapse.

## **Cocaine**

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine; Tannic acid grains in  $f\bar{3}$  i water or compound solution of iodine  $\mathfrak{M}\mathfrak{x}\mathfrak{x}$  in  $f\bar{3}$  i water; Again evacuate stomach; Stimulants of amyl nitrite inhalations and whisky or brandy; Hypodermic of morphine to counteract delirium; Intravenous injection of calcium chloride 10 percent; Artificial respiration if necessary.

## **Cocculus Indicus**

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine; Tannic acid grains xxx in  $f\bar{3}$  i water or compound solution of iodine  $\mathfrak{M}\mathfrak{x}\mathfrak{x}$  in  $f\bar{3}$  i water; Chloral hydrate in grain xxx doses; Amyl nitrite inhalations; Artificial respiration.

## **Codeine**

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine; Potassium permanganate grains ii to  $f\bar{3}$  xvi water, or tannic acid grains xxx to  $f\bar{3}$  i water; Evacuate stomach again; Atropine  $\frac{1}{20}$  grain or tincture of belladonna  $\mathfrak{M}\mathfrak{x}$  to xv every 15 minutes for three doses; Keep patient awake by citrated caffeine grains iii frequently and by walking, shaking, striking with towel, cold water to face, etc.; Inhalations of amyl nitrite; Artificial respiration if necessary.

## **Colchicum**

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine; Tannic acid grains xxx in  $f\bar{3}$  i water; Demulcents—elm bark mucilage, linseed tea, or gruel; For pain—opium grains i to ii; Stimulants—whisky or brandy; Heat to abdomen and extremities.

## **Colocynth**

Same as Colchicum.

## **Conium and Conine**

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine; Tannic acid grains xxx in  $f\bar{3}$  i water on compound solution of iodine  $\mathfrak{M}\mathfrak{x}\mathfrak{x}$  in  $f\bar{3}$  i water; Evacuate stomach again; Demulcents—elm bark mucilage, flaxseed tea or gruel; Stimulants—citrated caffeine grains iii, whisky or brandy or hypodermic of strychnine; Artificial respiration if necessary.

## **Copper and Compounds**

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine; White of egg in much water; Potassium ferrocyanide grains xv in  $f\bar{3}$  iv water; Repeat evacuation of stomach; Potassium iodide grains xv every 2 hours; For pain—tincture of opium  $\mathfrak{M}\mathfrak{x}$  or hypodermic of morphine  $\frac{1}{4}$  grain; Stimulant—Whisky or brandy  $f\bar{3}$  iv.

## **Creosote**

Stomach tube if excessive damage to stomach mucosa has not occurred; Otherwise emetic of mustard or hypodermic of apomorphine; Do not administer alcohol in any form, or oils, as it dissolves the poison and produces systemic effects; Sodium or magnesium sulfates; Demulcents—white of egg, milk, gruel, flaxseed tea, elm bark mucilage; Warmth to extremities; Inhalations of amyl nitrite; Hypodermic of atropine, strychnine or digitalin.

## **Croton Oil**

Stomach tube or emetic of copper sulfate grains x or mustard or zinc sulphate; Demulcents—olive oil  $f\bar{3}$  i or elm mucilage, flaxseed tea, white of egg, milk, etc.; For pain and purging—tincture of opium  $\mathfrak{M}\mathfrak{x}\mathfrak{x}$  or morphine  $\frac{1}{4}$  grain or hypodermic of morphine  $\frac{1}{6}$  grain repeated if necessary; Stimulants—spirit of camphor  $\mathfrak{M}\mathfrak{x}$  v in milk, or aromatic spirit of ammonia  $f\bar{3}$  i in water, or whisky or brandy  $f\bar{3}$  iv; Heat to body.

## **Cyanides**

The utmost speed is essential; Stomach tube or emetic of mustard or zinc sulfate assisted by pushing finger down throat; Immediately give large quantities of solution of hydrogen peroxide 3 percent or a freshly prepared mixture of sodium carbonate grains xx in  $f\bar{3}$  i water and ferrous sulfate grains xx, tincture of iron  $f\bar{3}$  i in  $f\bar{3}$  i water or fresh javelle water  $f\bar{3}$  i or chlorine water  $f\bar{3}$  iv.

Inhalations of amyl nitrite for 30 seconds every 3 to 5 minutes; Hypodermic injections of hydrogen peroxide  $\mathfrak{M}$  xv every few minutes; Intravenous injection of 50 cc. of methylene blue solution 1 percent, or 10 cc. of 3 percent solution sodium nitrite followed by 50 cc. of 50 percent solution sodium thiosulfate; Stimulants—whisky or brandy; Heat to body; Artificial respiration if necessary.

## **Daturine**

Same as Belladonna.

## **Digitalis**

Stomach tube or one of the following emetics if heart has not been affected—mustard or zinc sulfate or hypodermic of apomorphine; Tannic acid grains xxx to  $f\bar{3}$  i water or compound solution of iodine  $\mathfrak{M}$  xx to  $f\bar{3}$  i water; Evacuate stomach again; Magnesium sulfate  $\bar{5}$  ss in plenty of water as a cathartic; Keep patient in recumbent position for several days to avoid fatal syncope; Tincture of aconite  $\mathfrak{M}$  v; Tincture of opium  $\mathfrak{M}$  x; Stimulants—aromatic spirit of ammonia  $f\bar{3}$  i or whisky or brandy  $f\bar{3}$  iv.

## **Dinitrophenol**

Stomach tube using a 5 percent solution of sodium bicarbonate; Place the patient in an ice-pack to control fever; Inhalations of oxygen; Solution of dextrose, 6 percent intravenously.

## **Duboisia**

Same as Belladonna.

## **Duboisine**

Same as Belladonna.

## **Dulcamara**

Same as Belladonna.

## **Elaterium and Elaterin**

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine; Tannic acid grains xxx in  $\bar{3}$  i water; Demulcents—elm bark mucilage, linseed tea, or gruel; For pain—opium grains i to ii; Stimulants—whisky or brandy; Heat to abdomen and extremities.

## **Epinephrine and Ephedrine**

Stomach tube or emetic; Hot applications to body; Barbitol grains v to control excitement.

## **Ergot**

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine; Tannic acid grains xxx in  $f\bar{3}$  i water; Castor oil  $f\bar{3}$  i; Inhalations of amyl nitrite; Whisky or brandy  $f\bar{3}$  iv; Warmth to body.

## **Ether**

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine; Stimulate circulation with hypodermic of strychnine, or  $\mathfrak{M}$  xxx of 10 percent camphor in olive oil; Avoid hypodermic injections of ether or alcohol; Artificial respiration if necessary; Inhalations of amyl nitrite or ammonia.

## Fluorides

Emetic of mustard or zinc sulfate or hypodermic of apomorphine; Milk of magnesia.

## Food Poisoning

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine; Tannic acid grains xxx in  $f\bar{3}$  i water; Evacuate stomach again; Castor oil  $f\bar{3}$  i or magnesium sulfate  $\bar{3}$  i; For pain—tincture of opium  $\mathbb{M}$  x; For intestinal derangement—tincture of capsicum  $\mathbb{M}$  xv; For fever and kidneys—solution of ammonium acetate  $f\bar{3}$  ii; For nausea after stomach evacuation—Creosote  $\mathbb{M}$  iii in lime water  $f\bar{3}$  i.

## Formaldehyde

Stomach tube; Administer repeated doses of  $\mathbb{M}$  xv to xxx of solution of ammonium hydroxide 1 percent, which forms hexamethylenetetramine; Demulcents—Raw egg or egg and milk or barley water.

## Gamboge

Stomach tube or emetic of copper sulfate grains x or mustard or zinc sulphate; Demulcents—olive oil  $f\bar{3}$  i or elm mucilage, flaxseed tea, white of egg, milk, etc.; For pain and purging—tincture of opium  $\mathbb{M}$  xx or hypodermic of morphine  $\frac{1}{4}$  grain, repeated if necessary; Stimulants—spirit of camphor  $\mathbb{M}$  v in milk or aromatic spirit of ammonia  $f\bar{3}$  i in water, or whisky or brandy  $f\bar{3}$  iv; Heat to body.

## Gelsemium

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine; Tannic acid grains xxx in  $f\bar{3}$  i water; Evacuate stomach again; Castor oil  $f\bar{3}$  i; Tincture of belladonna  $\mathbb{M}$  xx; Tincture of digitalis  $\mathbb{M}$  xv; Aromatic spirit of ammonia  $f\bar{3}$  i, citrated caffeine grains iii, whisky or brandy  $f\bar{3}$  iv; Keep patient in recumbent position with alternating hot and cold douches to keep aroused; Artificial respiration if necessary.

## Gold and Compounds

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine if emesis has not already occurred; Wash stomach with 5 percent solution of sodium formaldehyde sulphonylate or white of egg in milk (in proportion of white of one egg for each four grains of mercuric salt swallowed); Evacuate stomach again; Leave a residual amount of six fluid ounces of 5 percent solution of sodium formaldehyde sulphonylate in the stomach; Potassium iodide grains xv every 2 hours; Intravenous injection of 100 cc. of 10 percent solution formaldehyde sulphonylate over a period of 30 minutes; Repeat in 4 to 6 hours if necessary; For pain—tincture of opium  $\mathbb{M}$  xv or morphine  $\frac{1}{4}$  grain; Heat to body.

Stimulants—Citrated caffeine grains iii or strychnine  $\frac{1}{60}$  grain or whisky or brandy  $f\bar{3}$  iv.

## Heroin

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine; Potassium permanganate grains ii to  $f\bar{3}$  xvi water, or tannic acid grains xxx to  $f\bar{3}$  i water; Evacuate stomach again; Atropine  $\frac{1}{20}$  grain or tincture of belladonna  $\mathbb{M}$  x to xv every 15 minutes for three doses; Keep patient awake by citrated caffeine grains iii frequently and by walking, shaking, striking, striking with towel, cold water to face, etc.; Inhalations of amyl nitrite; Artificial respiration if necessary.

## Hyoscyamus, Hyoscine, or Hyoscyamine

Same as Belladonna.

## Ignatia

Stomach tube preferable for evacuation; If not available use emetic of mustard or zinc sulfate or hypodermic of apomorphine, very cautiously, if at all; Tannic acid grains xxx in  $f\bar{3}$  i water or compound solution of iodine  $\mathbb{M}$  xx in  $f\bar{3}$  i water; Wash out stomach again; Spirit

of ethyl nitrite  $f\text{℥}$  ii or inhalations of amyl nitrite; Chloral hydrate grains xxx or potassium bromide  $f\text{℥}$  i; Intravenous injection of grains viiss sodium isoamyl ethyl barbiturate; Artificial respiration if necessary.

### ***Iodine***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine; Sodium thiosulphate grains xx in  $f\text{℥}$  i water or boiled starch paste or boiled flour paste; Demulcents—flaxseed tea, elm bark mucilage, or gruel; For pain—morphine  $\frac{1}{4}$  grain or tincture of opium  $\mathfrak{M}$  xv; Amyl nitrite inhalations; Stimulants—hypodermic of atropine or strychnine or digitalin.

### ***Jalap***

Stomach tube or emetic of copper sulfate grains x or mustard or zinc sulfate; Demulcents—olive oil  $f\text{℥}$  i or elm bark mucilage, flaxseed tea, white of egg, milk, etc.; For pain and purging—tincture of opium  $\mathfrak{M}$  xx or morphine  $\frac{1}{4}$  grain or hypodermic of morphine  $\frac{1}{6}$  grain repeated if necessary; Stimulants—spirit of camphor  $\mathfrak{M}$  v in milk or aromatic spirit of ammonia  $f\text{℥}$  i in water or whisky or brandy  $f\text{℥}$  iv; Heat to body.

### ***Lactucarium***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine; Potassium permanganate grains ii to  $f\text{℥}$  xvi water or tannic acid grains xxx to  $f\text{℥}$  i water; Evacuate stomach again; Atropine  $\frac{1}{120}$  grain or tincture of belladonna  $\mathfrak{M}$  x to xv every 15 minutes for three doses; Keep patient awake by citrated caffeine grains iii frequently and by walking, shaking, striking with towel, cold water to face, etc.; Inhalations of amyl nitrite; Artificial respiration if necessary.

### ***Lead and Compounds***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine; Magnesium sulfate  $\text{℥}$  ss or sodium sulfate  $\text{℥}$  ss or sodium phosphate  $\text{℥}$  ss or dilute sulphuric acid  $\mathfrak{M}$  xxx; Milk and demulcents; For pain—tincture of opium  $\mathfrak{M}$  x or morphine  $\frac{1}{4}$  grain; Heat to abdomen.

### ***Lobelia***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine; Tannic acid grains xxx and evacuate stomach again; Castor oil  $f\text{℥}$  i; Strychnine  $\frac{1}{60}$  grain; Whisky or brandy  $f\text{℥}$  iv; For pain—tincture of opium  $\mathfrak{M}$  xv.

### ***Mercury and Compounds***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine if emesis has not already occurred; Wash stomach with 5 percent solution of sodium formaldehyde sulfoxylate, or white of egg in milk (in proportion of white of one egg for each four grains of mercuric salt swallowed); Evacuate stomach again; Leave a residual amount of six fluid ounces of 5 percent solution of sodium formaldehyde sulfoxylate in the stomach; Potassium iodide grains xv every 2 hours; Intravenous injection of 100 cc. of 10 percent solution of sodium formaldehyde sulfoxylate over a period of 30 minutes; Repeat in 4 to 6 hours if necessary; For pain—tincture of opium  $\mathfrak{M}$  xv or morphine  $\frac{1}{4}$  grain; Heat to body; Stimulants—citrated caffeine grains iii or strychnine  $\frac{1}{60}$  grain or whisky or brandy  $f\text{℥}$  iv.

### ***Methanol (Wood Alcohol)***

See under Alcohol, Wood.

### ***Morphine***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine; Potassium permanganate grains ii to  $f\text{℥}$  xvi water or tannic acid grains xxx to  $f\text{℥}$  i water; evacuate stomach again; Atropine  $\frac{1}{120}$  grain or tincture of belladonna  $\mathfrak{M}$  x to xv every 15 minutes for three doses; Keep patient awake by citrated caffeine grains iii frequently and by walking,

shaking, striking with towel, cold water to face, etc.; Inhalations of amyl nitrite; Artificial respiration if necessary.

### ***Myristica***

Stomach tube and emetic of mustard or zinc sulfate or hypodermic of apomorphine; Aromatic spirit of ammonia  $f\text{3 i}$  in  $f\text{3 ii}$  water repeated every 15 minutes; Strychnine  $\frac{1}{60}$  grain.

### ***Nicotine***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic of apomorphine; Tannic acid grains xxx in  $f\text{3 i}$  water or compound solution of iodine  $\text{M xx}$  in  $f\text{3 i}$  water; Repeat evacuation of stomach; Spirit of ethyl nitrite  $f\text{3 i}$ ; Tincture of nux vomica  $\text{M xxx}$  or hypodermic of strychnine  $\frac{1}{60}$  grain; Stimulants—Whisky or brandy  $f\text{3 iv}$ ; Keep patient in recumbent position; Heat to body, cold to head.

### ***Nitroglycerine, Nitrates, Nitrites***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic apomorphine; Keep patient in recumbent position with plenty of air; Cold applications to head; Alternating hot and cold douches; Stimulants—Whisky or brandy  $f\text{3 iv}$ ; Tincture digitalis  $\text{M xv}$ ; Artificial respiration, if necessary.

### ***Nitrobenzene and Compounds***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic apomorphine; Solution of acetic acid 3 percent; Stimulants—whisky or brandy  $f\text{3 iv}$ , or hypodermic atropine or strychnine or digitalin.

### ***Nux Vomica***

Stomach tube preferable for evacuation. If not available use emetic of mustard or zinc sulfate or hypodermic apomorphine, very cautiously, if at all; Tannic acid grains xxx in  $f\text{3 i}$  water, or compound solution of iodine  $\text{M xx}$  in  $f\text{3 i}$  water; Wash out stomach again; Spirit of ethyl nitrite  $f\text{3 ii}$  or inhalations of amyl nitrate; Chloral hydrate grains xxx or potassium bromide  $\text{3 i}$ ; Intravenous injection of sodium isoamyl ethyl barbiturate grains viiss; Artificial respiration, if necessary.

### ***Oil of Cedar***

Stomach tube or emetic; Stimulants.

### ***Opium, and Derivatives***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic apomorphine; Potassium permanganate grains ii to  $f\text{3 xvi}$  water, or tannic acid grains xxx to  $f\text{3 i}$  water; Evacuate stomach again; Atropine  $\frac{1}{20}$  grain or Tincture belladonna  $\text{M x}$  to xv every 15 minutes for three doses; Keep patient awake by citrated caffeine grains iii frequently and by walking, shaking, striking with towel, cold water to face, etc.; Inhalations of amyl nitrite; Artificial respiration if necessary.

### ***Oil of Chenopodium***

Stomach tube or emetic; Magnesium sulfate,  $\text{3 ss}$  in  $f\text{3 i}$  water; Stimulant—citrated caffeine, grains iii or strychnine, hypodermically.

### ***Oxalic Acid and Oxalates***

Stomach tube only if mucous membrane has not been destroyed; otherwise, emetic of mustard or zinc sulfate; Suspension of calcium carbonate in water or much lime water; Do not give sodium or potassium salts or alkaline carbonate or bicarbonate, Stimulants; Demulcents—raw egg, milk, gruels; For pain—Tincture opium  $\text{M x}$  or hypodermic morphine; Much water to stomach.

### ***Paris Green***

Same as Arsenic.

## ***Paraldehyde***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic apomorphine; Tincture belladonna  $\mathfrak{M}$  x to xv every 15 to 60 minutes for 2 or 3 doses, or hypodermic atropine  $\frac{1}{20}$  grain at same intervals or strychnine  $\frac{1}{60}$  grain every  $\frac{1}{2}$  to 2 hours; heat to body and extremities.

## ***Permanaganates***

Emetic of mustard or zinc sulfate or hypodermic apomorphine; white of egg in water; solution of hydrogen peroxide made slightly alkaline with acetic acid.

## ***Petroleum, Benzin, Gasoline, Naphtha***

Artificial respiration, if necessary; heat to body and extremities; Aromatic spirit of ammonia  $f\mathfrak{z}$  i in water every 15 minutes; Amyl nitrite inhalations; For pain—Tincture opium  $\mathfrak{M}$  x or morphine  $\frac{1}{4}$  grain.

## ***Phenacetine***

Same as Acetanilid.

## ***Phenols, Cresols.***

Same as creosote.

## ***Phosphorus***

Stomach tube or emetic of copper sulfate grains v in  $f\mathfrak{z}$  i water every 5 minutes until it acts, or zinc sulfate or mustard; Give French (Bordeaux) turpentine  $f\mathfrak{z}$  i to  $f\mathfrak{z}$  ii or old oxidized turpentine; Magnesium sulfate  $\mathfrak{z}$  i in  $f\mathfrak{z}$  ii water. Spirit of ethyl nitrite  $f\mathfrak{z}$  i. Do not give fats, fatty oils or milk.

## ***Physostigma and Physostigmine***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic apomorphine; Tannic acid grains xxx in  $f\mathfrak{z}$  i water; Spirit of ethyl nitrite  $f\mathfrak{z}$  i; Tincture of belladonna  $\mathfrak{M}$  xx doses every 20 minutes; or hypodermic atropine  $\frac{1}{20}$  grain until pupils are dilated; hypodermic strychnine; Stimulant—whisky or brandy  $f\mathfrak{z}$  iv; Artificial respiration, if necessary.

## ***Phytolacca.***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic apomorphine; Aromatic spirit of ammonia  $f\mathfrak{z}$  i or whisky or brandy  $f\mathfrak{z}$  iv. For pain—morphine  $\frac{1}{4}$  grain or tincture of opium  $\mathfrak{M}$  x; cardiac stimulant—tincture of digitalis  $\mathfrak{M}$  x to xx; artificial respiration if necessary.

## ***Pilocarpus and Pilocarpine***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic apomorphine; Tannic acid grains xxx to  $f\mathfrak{z}$  i water. Repeat evacuation of stomach; Atropine  $\frac{1}{20}$  grain or tincture belladonna  $\mathfrak{M}$  xx every 20 minutes or hypodermic atropine  $\frac{1}{60}$  grain until pupils are dilated. Stimulants; For nausea—morphine.

## ***Ptomaines***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic apomorphine; Tannic acid grains xxx in  $f\mathfrak{z}$  i water. Evacuate stomach again; Castor oil  $f\mathfrak{z}$  i or magnesium sulfate  $\mathfrak{z}$  ss. For pain—Tincture of opium  $\mathfrak{M}$  x; For intestinal derangement—Tincture of capsicum  $\mathfrak{M}$  xv; For fever and kidneys—solution of ammonium acetate  $f\mathfrak{z}$  ii. For nausea after stomach evacuation—creosote  $\mathfrak{M}$  iii in lime water  $f\mathfrak{z}$  i.

## ***Pulsatilla***

Same as Phytolacca.

## ***Pyridine***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic apomorphine; Tannic acid grains xxx in  $f\mathfrak{z}$  i water. Repeat evacuation of stomach; Stimulants—Orally or hypodermic atropine or strychnine or digitalin; Artificial respiration if necessary.

## **Santonin**

Stomach tube or emetic; Magnesium sulfate  $\mathfrak{z}$  ss in  $f\mathfrak{z}$  i water; Barbital grains for convulsions; Stimulants—for collapse.

## **Savin**

Stomach tube or, if no severe inflammation of throat, emetic of mustard or zinc sulfate, otherwise emetic hypodermic apomorphine; Castor oil  $f\mathfrak{z}$  i or magnesium sulfate  $\mathfrak{z}$  i in  $f\mathfrak{z}$  ii water; Demulcents of elm bark mucilage, flaxseed tea, gruels, etc.; For pain—morphine  $\frac{1}{4}$  grain or Tincture of opium  $\mathfrak{M}$  x to xx.

## **Scammony**

Stomach tube or emetic of copper sulfate grains x or mustard or zinc sulfate; Demulcents—live oil  $f\mathfrak{z}$  i or elm bark mucilage, flaxseed tea, white of egg, milk, etc.; For pain and purging—Tincture of opium  $\mathfrak{M}$  xx or morphine  $\frac{1}{4}$  grain, repeated if necessary; Stimulants—Spirit of camphor  $\mathfrak{M}$  v in milk, or aromatic spirit of ammonia  $f\mathfrak{z}$  i in water, or whisky or brandy  $f\mathfrak{z}$  iv; Heat to body.

## **Scopolamine**

Same as Belladonna.

## **Silver and Compound**

Stomach tube, using a strong solution of sodium chloride or emetic of mustard or zinc sulfate in sodium chloride solution; Sodium chloride solution and white egg, milk, or egg and milk; Demulcents of elm bark mucilage or flaxseed tea or gruel; Stimulants; For pain—tincture of opium  $\mathfrak{M}$  x or morphine  $\frac{1}{4}$  grain.

## **Solanine**

Same as Belladonna.

## **Spigelia**

Stomach tube or emetic of mustard or zinc sulfate or hypodermic apomorphine; Stimulants—aromatic spirit of ammonia  $f\mathfrak{z}$  i or whisky or brandy  $f\mathfrak{z}$  iv.

## **Squill**

Stomach tube or one of the following emetics if heart has not been affected: mustard or zinc sulfate or hypodermic apomorphine. Tannic acid grains xxx to  $f\mathfrak{z}$  i water, or compound solution of iodine  $\mathfrak{M}$  xx to  $f\mathfrak{z}$  i; Evacuate stomach again; Magnesium sulfate  $\mathfrak{z}$  ss in plenty of water as a cathartic; Avoid fatal syncope. Tincture of Aconite  $\mathfrak{M}$  v; Tincture of opium  $\mathfrak{M}$  x. Stimulants—aromatic spirit of ammonia  $i\mathfrak{z}$  i or whisky or brandy  $f\mathfrak{z}$  iv.

## **Staphisgria**

Stomach tube or emetic of mustard or zinc sulfate or hypodermic apomorphine. Tannic acid grains xxx in  $f\mathfrak{z}$  i water or compound solution of iodine  $\mathfrak{M}$  xx in  $f\mathfrak{z}$  i water; Repeat evacuation of stomach; Chloride hydrate grains xxx or potassium bromide  $\mathfrak{z}$  ii or inhalations of chloroform to control spasms; Artificial respiration, if necessary.

## **Stramonium**

Tannic acid grain xxx in  $f\mathfrak{z}$  i water or compound solution of iodine  $\mathfrak{M}$  xx in  $f\mathfrak{z}$  i water; Evacuate stomach with stomach tube or emetic of mustard or zinc sulfate or hypodermic apomorphine; Tincture of opium  $\mathfrak{M}$  x to xv to quiet excitement, also eserine 1/60 to 1/30 grain. Stimulants—citrate caffeine grains  $111$  or whisky or brandy  $f\mathfrak{z}$  iv, Heat to extremities; Alternate hot to cold douches to combat depression; Artificial respiration, if necessary; Inhalations of ammonia.

## ***Strophanthus***

Stomach tube or one of the following emetics if heart has not been affected; Mustard or zinc sulfate or hypodermic apomorphine; Tannic acid grains xxx to  $f\frac{3}{4}$  i water or compound solution of iodine  $\mathfrak{M}$  xx to  $f\frac{3}{4}$  i water; Evacuate stomach again; Magnesium sulfate  $\frac{3}{4}$  ss in plenty of water as a cathartic; Avoid fatal syncope; Tincture of aconite  $\mathfrak{M}$  v; Tincture of  $\mathfrak{M}$  x; Stimulants—aromatic spirit of ammonia  $f\frac{3}{4}$  i or whisky or brandy  $f\frac{3}{4}$  iv.

## ***Strychnine***

Same as Nux Vomica.

## ***Sulphonal and Trional***

Stomach tube or emetic of mustard or zinc sulfate of hypodermic apomorphine; Spirit of ethyl nitrite  $f\frac{3}{4}$  ii; Magnesium sulfate  $\frac{3}{4}$  i in water  $f\frac{3}{4}$  ii; Solution of sodium bicarbonate frequently. Citrated caffeine, and strychnine if necessary.

## ***Tansy***

Same as Savin.

## ***Thallium and Compounds***

Stomach tube or emetic; Sodium iodide grains xxx; Calcium gluconate grains Lxxv.

## ***Tin and Compounds***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic apomorphine; Milk of magnesia or ammonium carbonate grains x in water  $f\frac{3}{4}$  viii or white of egg or soap and water; Demulcents of elm bark mucilage, flaxseed tea, acacia mucilage, oil and water emulsion or gruel; For pain—morphine  $\frac{1}{4}$  grain or tincture of opium  $\mathfrak{M}$  x or hypodermic morphine.

## ***Tobacco and Nicotine***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic apomorphine; Tannic acid grains xxx in water  $f\frac{3}{4}$  i or compound solution of iodine  $\mathfrak{M}$  xx in water  $f\frac{3}{4}$  i; Repeat evacuation of stomach; Spirit of ethyl nitrate  $f\frac{3}{4}$  i; Tincture nux vomica  $\mathfrak{M}$  xxx or strychnine  $\frac{1}{10}$  grain; Keep patient in recumbent position. Stimulants—whisky or brandy  $f\frac{3}{4}$  iv; Heat to body, cold to head.

## ***Trinitrophenol (Picric Acid)***

Stomach tube or emetic; Give large quantity of water.

## ***Turpentine***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic apomorphine. Plenty of water and diuretics; Demulcent—elm bark mucilage, linseed tea or gruel. For pain—morphine  $\frac{1}{4}$  grain or tincture of opium  $\mathfrak{M}$  x.

## ***Veratrum, Veratrine, Sabasilla***

Stomach tube or emetic of mustard or zinc sulfate or hypodermic apomorphine. Tannic acid grains xxx in water  $f\frac{3}{4}$  i or compound solution of iodine.  $\mathfrak{M}$  xx in water  $f\frac{3}{4}$  i; Repeat evacuation of stomach; Stimulants—citrated caffeine grains iii or aromatic spirit of ammonia  $f\frac{3}{4}$  ss, whisky or brandy  $f\frac{3}{4}$  iv or atropine  $\frac{1}{120}$  grain; Keep patient in recumbent position with head low—do not allow him to rise, even to vomit; Heat to body; Artificial respiration, if necessary.

## ***Zinc and Compounds***

Stomach tube using solution of sodium bicarbonate or emetic of mustard and sodium bicarbonate or hypodermic apomorphine. Tannic acid grains xxx in water  $f\frac{3}{4}$  i. Stimulants—citrated caffeine grains iii or aromatic spirit of ammonia  $f\frac{3}{4}$  i in water or atropine or strychnine or digitalin. For pain—morphine  $\frac{1}{4}$  grain or Tincture of Opium  $\mathfrak{M}$  x.

## NOTES

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper appears to be a standard notebook page or a sheet of stationery. There is no handwriting or other markings on the page.

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## PHARMACY

An elementary knowledge of pharmacy has always been a prerequisite of promotion for all enlisted men of the Navy Medical Department. The advancement of even the "loblolly" boys and the surgeon's mates was in a large measure predicated on their familiarity with medicinal substances.

Until late in the Nineteenth Century, it was the general custom to procure the bulk of medicinal supplies needed on ships and stations from local apothecaries. However, about 1842, there was established at the naval hospital at Brooklyn, N. Y., the forerunner of the Navy's Medical Supply Depot.

Under the direction of Dr. E. R. Squibb, a medical officer, who later founded the pharmaceutical house which now bears his name, medicines were compounded, packaged and distributed to ships and stations of the Navy on request. Local purchase of drugs and medicines was continued, but this institution was a great stride forward.

As medical science progressed more and more medicinal substances were used. At the same time the complexities of compounding expanded and it was necessary that there be men in the Navy, experienced and trained in the art of compounding. The "apothecaries," who first appeared in 1866, were enlisted men qualified by training and experience to perform the duties of a "pharmacist."

It has been customary since the Civil War Period for the Navy Medical Department to compound a large portion of its medicines from crude drugs. This work has been done mostly by enlisted men, whose theoretical and practical knowledge has been attained in the Navy. Mass production manufacturing methods, however, have caused a trend toward the purchase of many pharmaceuticals from the commercial manufacturers in recent years.

There still remains a need for technicians in the Navy, since many compounds are manufactured in the various activities. In the past, thousands of hospital corpsmen have proven their ability and worth as pharmacists.

With the advent of the Medical Service Corps and its pharmacy section, there is little change contemplated other than perhaps an acceleration in the numbers of men to be trained in Navy schools

of pharmacy. Under the present law, there is no opportunity for a pharmacy technician to advance to commissioned rank in the pharmacy section on the basis of his inservice training. However, each hospital corpsman, particularly in the higher ratings, should have a basic knowledge of the science of pharmacy.

Described briefly in this section are a few elemental factors with which a hospital corpsman, who is not a technician, should be familiar.

### *Standard Texts*

Three books, to be found in almost every medical department activity, are:

1. The United States Pharmacopoeia, generally referred to as the "U. S. P."
2. The National Formulary, the "N. F."
3. The United States Dispensatory.

The first of these, the U. S. P., is published under the authority of the U. S. Pharmacopoeial Convention (formerly every 10 years; since 1936 every 5 years). This book is recognized as the official standard, by national and state food and drug laws, for drugs contained therein. It contains a list of medicinal substances with descriptions, tests, and formulas for preparing them.

The N. F., secondary to the U. S. P., but a companion volume in a sense, occupies the same official position, when not in conflict, as the U. S. P. by the terms of the Federal Food, Drug, and Cosmetic Laws.

The U. S. Dispensatory gives a complete description of the physical, medical, and pharmaceutical history of medicinal substances, their preparation and properties, constituents and compounds, uses, action and doses, tests and assays. The comments of the Dispensatory are not limited to medicine contained in the U. S. P. and N. F., but include drugs and chemicals described in foreign pharmacopoeias as well as many unofficial substances.

Other texts, of which a familiarity is desirable, include "New and Non-Official Remedies," published by the American Medical Association; Army's "Principles of Pharmacy"; Remington's "Practice of Pharmacy"; and Gutman's "Modern Drug Encyclopedia." The student's interest and reading should not be limited to those books mentioned above, but reference should be made to scores of other similar texts.

## Pharmaceutical Arithmetic

An adequate knowledge of fundamental mathematics is essential for the completion of any compounding of pharmaceuticals. Yet only a knowledge or understanding of basic arithmetic is all that is necessary to calculate any pharmacy problem likely to be encountered by the average hospital corpsman.

Basically, it is necessary that the metric system of weights and measures be learned, so that it is as well understood as the ability to count from 1 to 100. Then, for the reason that the apothecary system of weights and measures is used by the medical profession in the United States as much or more than the metric system, an ability to convert from one system to the other must be attained.

Generally, it is easier to make calculations in the metric system. It is elemental that this system is one of decimals or "tens," in which each unit is 10 times the unit next smaller. Since most problems in pharmacy concern "percentage," this system is a "natural."

"Percentage" means parts per hundred. Rarely, however, is the pharmacist called upon to compound exactly 100 units of a solution or mixture. Therefore, to avoid waste and to save time, it is required that the application of the principles of ratio and proportion be known. This leads to expansion or contraction of formulas.

While it is possible thus to solve any problem, there are certain occasions, notably when there is more than one "unknown," that a knowledge of alligation is desirable. *Alligation* (sometimes called "the rule of mixtures") is an arithmetical process used in ascertaining the relative amount of different strengths of the same substance which is needed to blend into a substance of a definite intermediate strength.

Alligation is an anathema to most people, not the least to hospital corpsmen. There should be no fear, however, when confronted with a problem of this nature, since the application of simple processes usually learned in elementary school makes its solution easy.

The principle of *alligation* should be understood. The procedure is made use of to determine the amounts of two or more strength of a given substance that is needed to blend into a new, intermediate strength of that substance. It is also applied in making adjustments of percentage or ratio strengths and of specific gravities.

In the problems that follow, the principles, while simple, will serve to illustrate the method which can be used (with slight variations) to solve any similar problem:

*What is the percentage of alcohol in a mixture of 1,500 cc. of 60% alcohol, 400 cc. of 40% alcohol, and 500 cc. of 50% alcohol?*

To avoid error, set down the known elements and analyze each part:

1,500 cc. of alcohol, 60% = ? Gms. alcohol

500 cc. of alcohol, 50% = ? Gms. alcohol

400 cc. of alcohol, 40% = ? Gms. alcohol

By definition, "percent" means "parts per hundred." Then, 100 cc. of 60% alcohol contains 60 Gms. of alcohol. If 100 cc. contains 60 Gms., the problem is to determine how many Gms. are contained in 1,500 cc. It is a simple matter by ratio and proportion:

100 cc. is to 60 Gm. as 1,500 cc. is to ? Gms.

For convenience, it is written:

100:60::1,500:X

solving,

100X (100 times X = 90,000 (1,500 × 60)

X = 90,000 ÷ 100 or 900 Gms. alcohol in 1,500 cc. of 60% alcohol.

The remaining parts of the problem are completed in the same manner:

100:50::500:X

100X = 25,000

X = 250 Gms. alcohol in 500 cc. of 50% alcohol.

100:40::400:X

100X = 16,000

X = 160 Gms. alcohol in 400 cc. of 40% alcohol.

Adding:

900 Gms. in 1,500 cc.

250 Gms. in 500 cc.

160 Gms. in 400 cc.

---

1,310 Gms. in 2,400 cc.

1,310:2,400::x:100

2,400X = 131,000

X = 131,000 ÷ 2,400 or 54.58%, the percent of alcohol in the combined mixture.

*How many Grams of Silver Nitrate must be weighed out to make 60 cc. of a 10% solution?*

Here again is a "percentage" problem. If 100 cc. were to be made, it is obvious that 10 Gms. would be necessary. Ratio and proportion solves the problem:

$$100:10::60:X$$

$$100X=600$$

$X=6$  Gms. silver nitrate, needed to make 60 cc. of a 10% solution.

*A basic formula for compounding a prescription is given to prepare 500 cc.:*

Iodine.....	35 Gm.
Potassium Iodide.....	25 Gm.
Distilled water.....	25 cc.
Alcohol, a sufficient quantity to make.....	500 cc.

*How much of each ingredient must be used to make 120 cc. of the formula?*

This procedure, a very common one, is called "reducing a formula." Each ingredient is considered separately:

500 cc. require 35 Grams of Iodine—then

120 cc. require how much?

$$500:35::120:X$$

$$500X=120 \times 35 \text{ or } 4,200$$

$X=4,200 \div 500$  or 8.4 Gms. Iodine needed to make 120 cc. of the formula.

$$500:25::120:X$$

$$500X=120 \times 25 \text{ or } 3,000$$

$X=3,000 \div 500$  or 6 Gms. Potassium Iodide (also 6 cc. distilled water) needed to make 120 cc. of the formula.

The formula calls for a quantity of alcohol sufficient to make 500 cc. The alcohol needed then, in the same proportion, is merely that to make the new prescription measure 120 cc. The complete new formula is:

Iodine.....	8.4 Gms.
Potassium Iodide.....	6.0 Gms.
Distilled Water.....	6.0 cc.
Alcohol, a sufficient quantity to make.....	120.0 cc.

## NOTES

## Weights and Measures

### Metric Length

		<i>English Equivalent</i> (Approximate)
1 Kilometer	= 1,000 Meters	= 3,280 feet
1 Hectometer	= 100 Meters	= 328 feet
1 Dekameter	= 10 Meters	= 32.8 feet
1 Meter	= 1,000 millimeters	= 39.37 inches
1 decimeter	= 1/10 Meter	= 3.937 inches
1 centimeter	= 1/100 Meter	= 0.393 inch
1 millimeter	= 1/1000 Meter	= 0.039 inch

### Metric Capacity

		<i>English Equivalent</i> (Approximate)
1 Kiloliter	= 1,000 Liters	= 25 gallons
1 Hectoliter	= 100 Liters	= 2.5 gallons
1 Dekaliter	= 10 Liters	= 2.114 pints
1 Liter	= 1,000 milliliters	= 33.814 fluid ounces
1 deciliter	= 1/10 Liter	= 3.381 fluid ounces
1 centiliter	= 1/100 Liter	= 0.338 fluid ounce
1 milliliter	= 1/1000 Liter	= 0.033 fluid ounce

### Metric Weight

		<i>Apothecaries</i> <i>equivalent</i>
1 Kilogram	= 1,000 Grams	= 32.15 ounces
1 Hectogram	= 100 Grams	= 3.21 Do.
1 Dekagram	= 10 Grams	= 0.32 ounce
1 Gram	= 1,000 milligrams	= 15.432 grains
1 decigram	= 1/10 Gram	= 0.15 grain
1 centigram	= 1/100 Gram	= .15 grain
1 milligram	= 1/1000 Gram	= .015 Do.

### Avoirdupois Weight

	<i>Apothecaries</i> <i>equivalent</i>
1 grain	= 0.065 Gram
437.5 grains = 1 ounce	= 28.35 Grams
16 ounces = 1 pound	= 453.60 Do.
100 pounds = 1 hundredweight	= 45.36 Kilograms

## Apothecaries Weight

		<i>Apothecaries equivalent</i>
1 grain	=	0.065 Gram
20 grains = 1 scruple	=	1.30 Grams
3 scruples = 1 dram	=	3.90 Do.
8 drams = 1 ounce	=	31.103 Do.
12 ounces = 1 pound	=	373.236 Do.

## Apothecaries Capacity

		<i>Apothecaries equivalent</i>
1 minim	= 0.95 grain	= 0.06 cc.
60 minims	= 1 fluid dram	= 3.7 cc.
8 fluid drams	= 1 fluid ounce	= 29.57 cc.
16 fluid ounces	= 1 pint	= 473.18 cc.
8 pints	= 1 gallon	= 3,785.40 cc.

## Commonly Used Equivalents

Cubic centimeter	=	16.23 minims
Fluid ounce	=	29.57 cubic centimeters
Fluid dram	=	3.9 Do.
Pint	=	473.18 Do.
Gallon	=	3,785.0 Do.
Grain	=	64.8 milligrams
Gram	=	15.432 grains
Ounce (apothecary)	=	31.103 Grams
Pound (apothecary)	=	373.236 Grams
Ounce (avoirdupois)	=	28.35 Grams
Pound (avoirdupois)	=	453.592 Grams
Kilogram	=	2.2 pounds
Inch	=	25.4 millimeters
Meter	=	39.37 inches
Drop (water)	=	0.06 cubic centimeters
Drop (alcohol)	=	0.03 Do.
Teaspoonful	=	4 Do.
Desertspoonful	=	8 Do.
Tablespoonful	=	16 Do.
Wineglassful	=	60 Do.
Teacupful	=	120 Do.
Tumblerful	=	240 Do.

## Conversions

Cubic centimeters to Grams.	Number of cc's×specific gravity=weight of Grams.
Fluid ounces to grains-----	Specific gravity×number of fluid ounces×454.6=weight in grains.
Minims to grains-----	Specific gravity×number of minims×0.95=weight in grains.
Fluid drams to drams-----	Specific gravity×number of fluid drams×0.95=weight in drams.
Fluid ounces to ounces-----	Specific gravity×number of fluid ounces×0.95=weight in ounces.
Grams to cubic centimeters.	Weight in Grams÷specific gravity=volume in cubic centimeters.
Grains to fluid drams-----	Weight in grains÷454.6÷specific gravity=volume in fluid drams.
Grains to minims-----	Number of grains÷0.95÷specific gravity=volume in minims.
Drams to fluid drams-----	Number of drams÷0.95÷specific gravity=volume in fluid drams.
Ounces to fluid ounces-----	Number of ounces÷0.95÷specific gravity=volume in fluid ounces.

## Abbreviations and Symbols

a. a.	=of each	non. rep.	=do not repeat
ad	=to, up to	p. c.	=after eating
ad lib	=at pleasure	p. r. n.	=occasionally, as needed
a. c.	=before eating	pulv.	=powder
b. i. d.	=twice a day	q. s.	=a sufficient quantity
c	=with	R	=take (thou)
cc.	=cubic centimeter	s	=without
coch. amp.	=tablespoonful	ss	=one-half
coch. mag.	=large spoonful	sig.	=mark thou (directions)
coch. med.	=dessertspoonful	t. i. d.	=three times a day
coch. parv.	=teaspoonful	ut. dict.	=as directed
cong.	=gallon	℥	=minim
ft.	=make	℥	=scruple
Gm.	=Gram	℥	=dram
gr.	=grain	℥	=ounce
gtt.	=drop	f℥	=fluid dram
lb.	=pound	f℥	=fluid ounce
M.	=mix	℥	=pint
mil.	=milliliter (same as cc.)		

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## UNOFFICAL FORMULAS

### A. P. C. CAPSULE

Aspirin.....	0. 195 Gm.
Phenacetin.....	0. 130 Gm.
Citrated Caffeine.....	0. 032 Gm.

Mix the powders intimately, pass them through a No. 40 sieve and pack in a No. 1 capsule.

### CORYZA CAPSULE

Camphor.....	0. 032 Gm.
Citrated Caffeine.....	0. 032 Gm.
Phenacetin.....	0. 065 Gm.
Aspirin.....	0. 162 Gm.
Atropine Sulfate.....	0. 00013 Gm.
Powdered Opium.....	0. 016 Gm.

• Alcohol, q. s.

Powder the camphor by intervention with a sufficient quantity of alcohol. Add the remaining powders and triturate until thoroughly mixed. Pass them through a No. 40 sieve and pack in a No. 1 capsule.

### CORYZA CAPSULE

Sodium Salicylate.....	0. 124 Gm.
Dover's Powder.....	0. 065 Gm.
Quinine Sulfate.....	0. 065 Gm.

Mix the powders intimately, pass them through a No. 40 sieve and pack in a No. 1 capsule.

### ANALGESIC CAPSULE

Aspirin.....	0. 324 Gm.
Sodium Pentobarbital.....	0. 032 Gm.

Mix the powders intimately, pass them through a No. 40 sieve and pack in a No. 1 capsule.

### ASTHMA CAPSULE

Ephedrine Hydrochloride.....	0. 025 Gm.
Phenobarbital.....	0. 050 Gm.
Milk sugar.....	0. 150 Gm.

Mix the powders intimately, pass them through a No. 40 sieve and pack in a No. 2 capsule.

### ANTIRHEUMATIC CAPSULE

Sodium Bicarbonate.....	0.325 Gm.
Sodium Salicylate.....	0.325 Gm.

Mix the powders intimately, pass them through a No. 40 sieve and pack in a No. 0 capsule.

### COMPOUND SALICYLATE CAPSULE

Aspirin.....	0.260 Gm.
Sodium Bicarbonate.....	0.195 Gm.
Sodium Salicylate.....	0.195 Gm.

Mix the powders intimately, pass them through a No. 40 sieve and pack in a No. 0 capsule.

### IRON CAPSULE

Iron and Ammonium Citrate.....	0.486 Gm.
Heavy Magnesium Oxide.....	0.097 Gm.

Triturate the iron and ammonium citrate until finely powdered, add the heavy magnesium oxide and mix intimately. Pack in a No. 0 capsule.

### AGAR EMULSION OF MINERAL OIL

Agar.....	0.23 Gm.
Acacia, in fine powder.....	0.40 Gm.
Tragacanth, in fine powder.....	0.40 Gm.
Oil of Sweet Orange.....	0.30 cc.
Liquid Petrolatum.....	50.00 cc.
Glycerin.....	3.00 cc.
Saccharin.....	0.02 Gm.
Imitation Vanilla Extract.....	0.25 cc.
Sodium Benzoate.....	0.20 Gm.
Distilled Water.....	50.00 cc.

Add the agar to 47 cc. of distilled water, previously heated to the boiling point, and continue the heat until the agar is dissolved. Shake in a bottle of appropriate capacity the liquid petrolatum, oil of sweet orange, acacia, and tragacanth until emulsified. Add the agar solution and continue shaking. Then add the glycerin, saccharin, imitation vanilla extract, and sodium benzoate previously dissolved in 3 cc. of distilled water. Mix thoroughly.

### WINTERGREEN LINIMENT

Methyl Salicylate.....	5.0 cc.
Camphor and Soap Liniment, q. s. ad.....	100.0 cc.

Mix by agitation.

## DIARRHEA MIXTURE

Bismuth Subnitrate.....	8.30 Gm.
Prepared Chalk.....	4.98 Gm.
Acacia .....	3.32 Gm.
Powdered Sugar.....	8.30 Gm.
Camphorated Tincture of Opium.....	16.60 cc.
Compound Digestive Elixir, q. s. ad.....	100.00 cc.

Triturate the powders until a fine powder results. Add the camphorated tincture of opium and the compound digestive elixir.

Note.—These powders will not go into solution. Dispense with “shake well” label.

## HAND LOTION

Tragacanth .....	1.00 Gm.
Boric Acid.....	3.00 Gm.
Menthol .....	0.02 Gm.
Oil of Rose.....	0.10 cc.
Glycerin .....	12.00 cc.
Alcohol .....	18.00 cc.
Water, q. s. ad.....	100.00 cc.

Triturate the tragacanth and the boric acid until finely powdered; add the glycerin; add the menthol and the oil of rose previously dissolved in the alcohol, then add sufficient water to make the product measure 100 cc.

## CREAM LOTION

Triethanolamine .....	10.0 Gm.
Petrolatum .....	15.0 Gm.
White Wax.....	5.0 Gm.
Anhydrous Wool Fat.....	5.0 Gm.
Distilled Water.....	75.0 cc.

Melt the wax, wool fat, and the petrolatum by low heat. Mix the triethanolamine with the distilled water and heat in a separate container until quite warm. Add the aqueous solution to the oils, stirring constantly, until a uniform preparation results.

## CALCIUM LOTION

Prepared chalk.....	10.0 Gm.
Glycerin.....	15.0 cc.
Solution of Calcium Hydroxide, q. s. ad.....	100.0 cc.

Triturate the prepared chalk until smooth, add gradually the solution of calcium hydroxide and the glycerin.

### CAMPHOR-SULFUR LOTION

Spirit of Camphor.....	10.0 cc.
Alcohol .....	10.0 cc.
Tragacanth, ribbon.....	1.5 Gm.
Precipitated Sulfur.....	6.0 Gm.
Water, q. s. ad.....	100.0 cc.

Mix the spirit of camphor with the alcohol. Macerate the tragacanth in 50 cc. of water until thoroughly softened and suspend the sulfur in the product by trituration. Mix the two liquids and finally add sufficient water to make the product measure 100 cc.

### COLD CREAM

Anhydrous Wool Fat.....	5.00 Gm.
Paraffin .....	5.00 Gm.
White Wax.....	12.50 Gm.
Liquid Petrolatum.....	55.00 cc.
Distilled Water.....	25.00 cc.
Sodium Borate.....	0.63 Gm.
Mercurochrome Solution (2%) .....	5.00 cc.
Oil of Rose Geranium.....	6.00 cc.

Melt the wax, paraffin, and wool fat over a low flame. Add the liquid petrolatum. Dissolve the sodium borate in the distilled water and heat to the same temperature of the oils. Add the aqueous solution to the oils, stirring constantly. Add the mercurochrome solution and the oil of rose geranium and stir until a uniform color results.

### POWDER, ANTACID

Magnesium Oxide.....	27.5 Gm.
Bismuth Subcarbonate.....	16.0 Gm.
Salol .....	8.0 Gm.
Sodium Bicarbonate.....	48.5 Gm.

Mix intimately and pass through a No. 60 sieve.

### POWDER, SALINE GARGLE

Menthol .....	0.45 Gm.
Camphor .....	0.45 Gm.
Sodium Bicarbonate.....	50.00 Gm.
Sodium Chloride.....	50.00 Gm.

Triturate the menthol and camphor in a dry mortar until liquefied. Add the sodium chloride and the sodium bicarbonate and mix thoroughly. For use add 1 to 2 teaspoonsful to a water glass of hot water.

## HAND LOTION

Camphor .....	0. 75 Gm.
Menthol.....	1. 50 Gm.
Boric Acid.....	1. 50 Gm.
Sodium Bicarbonate.....	1. 50 Gm.
Alcohol .....	25. 00 cc.
Water, q. s. d.....	100. 00 cc.

Dissolve the camphor and menthol in the alcohol, and the boric acid and sodium bicarbonate in 70 cc. of water. Pour the alcohol solution gradually into the aqueous solution and after the mixture has been permitted to stand for 24 hours, filter. Add sufficient water to make the product measure 100 cc.

## POISON IVY LOTION

Menthol .....	0. 4 Gm.
Phenol.....	0. 8 Gm.
Zinc Oxide.....	25. 0 Gm.
Olive Oil.....	12. 5 Gm.
Extract of Witch Hazel.....	12. 5 Gm.
Solution of Calcium Hydroxide, q. s. d.....	100. 0 cc.

Triturate the menthol and phenol until liquefied. Add the zinc oxide and triturate until a fine powder results. Slowly add the other ingredients and mix thoroughly.

## POWDER, ANTACID

Magnesium Oxide.....	27. 5 Gm.
Bismuth Subcarbonate.....	16. 0 Gm.
Salol .....	8. 0 Gm.
Sodium Bicarbonate.....	48. 5 Gm.

Mix intimately and pass through a No. 60 sieve.

## HEMORRHOID OINTMENT

Morphine Sulfate.....	1.38 Gm.
Extract of Belladonna (pillular).....	9.72 Gm.
Tannic Acid.....	9.72 Gm.
Anhydrous Wool Fat.....	14.00 Gm.
Petrolatum .....	60.00 Gm.
Distilled Water.....	6.00 cc.

Rub the tannic acid and the extract of belladonna with the anhydrous wool fat and the morphine sulfate previously dissolved in the distilled water. Add the petrolatum and thoroughly incorporate.

### POWDER, LAXATIVE

Phenolphthalein .....	2.2 Gm.
Sodium Bicarbonate .....	8.8 Gm.
Magnesium Carbonate .....	8.8 Gm.
Oil of Peppermint .....	2.0 cc.
Milk Sugar .....	78.2 Gm.

Mix intimately and pass through a No. 60 sieve.

### HEMORRHOID OINTMENT

Cocaine Hydrochloride .....	0.21 Gm.
Extract of Belladonna (pillular) .....	6.22 Gm.
Tannic Acid .....	12.44 Gm.
Glycerin .....	12.50 cc.
White Wax .....	12.44 Gm.
Alcohol (50%) .....	3.00 cc.
White Petrolatum .....	48.00 Gm.

Rub the extract of belladonna and the tannic acid with the glycerin until a thin paste results. Melt the white wax and the petrolatum over a water bath. Add the glycerin paste to the melted wax. Add the cocaine hydrochloride previously dissolved in the alcohol and stir until a uniform ointment results.

### NOSE OINTMENT

Ephedrine Alkaloid .....	0.5 Gm.
Menthol .....	1.6 Gm.
Camphor .....	0.3 Gm.
White Petrolatum .....	97.6 Gm.

Triturate the menthol and camphor until liquefied. Add the ephedrine alkaloid and then the white petrolatum. Thoroughly incorporate.

### HEMORRHOID OINTMENT

Zinc Oxide .....	10.0 Gm.
Ichthyol .....	10.0 Gm.
Fluid extract of Ergot .....	5.0 cc.
Benzoinated Lard .....	50.0 Gm.
Petrolatum .....	250.0 Gm.

Incorporate the zinc oxide with the ichthyol and the fluid extract of ergot, then add to the benzoinated lard and petrolatum.

### STOMACH POWDER

Heavy Magnesium Oxide .....	0.6 Gm.
Sodium Bicarbonate .....	0.6 Gm.

To make: 1 powder

Mix.

### DIGESTIVE POWDER

Saccharated Pepsin.....	15.0 Gm.
Pancreatin .....	15.0 Gm.
Diastase .....	1.0 Gm.
Lactic Acid.....	1.0 cc.
Hydrochloric Acid.....	2.0 cc.
Lactose .....	66.0 Gm.

Add the acids gradually to the lactose, and triturate until they are thoroughly mixed. Mix the pepsin, pancreatin, and the diastase, and then incorporate this mixture by trituration with the lactose. Finally, rub the mixture through a hair sieve. Keep in a stoppered bottle.

### STOMACH POWDER

Precipitated Calcium Carbonate.....	0.6 Gm.
Sodium Bicarbonate.....	2.0 Gm.

To make: 1 powder

Mix.

### NASAL SPRAY

Menthol .....	0.50 Gm.
Camphor .....	0.50 Gm.
Methyl Salicylate.....	0.125 cc.
Light Liquid Petrolatum, q. s. ad.....	100.00 cc.

Triturate the menthol, camphor, and methyl salicylate in a warm, dry mortar until liquefied. Add the light liquid petrolatum and mix thoroughly.

### NOSE DROPS

Ephedrine Hydrochloride.....	1.00 Gm.
Sodium Chloride.....	0.85 Gm.
Distilled Water, q. s. ad.....	100.00 cc.

Dissolve the ephedrine hydrochloride and the sodium chloride in 100 cc. of distilled water and filter through a wetted filter paper until a clear solution results. **NOTE.**—Gentian violet in the proportion of 1 to 100,000 should be added as a preservation.

### TOOTH POWDER

Thymol .....	2 Gm.
Precipitated Calcium Phosphate.....	98 Gm.
Ethyl Oxide.....	4 cc.

Dissolve the thymol in the ethyl oxide and pour the solution over the calcium phosphate while triturating. Triturate until the odor of ethyl oxide is no longer perceptible and then pass through a No. 40 sieve.

## FOOT POWDER

Compound Cresol Solution.....	2.3 cc.
Precipitated Sulfur.....	5.0 Gm.
Menthol.....	0.5 Gm.
Camphor.....	0.5 Gm.
Salicylic Acid.....	1.0 Gm.
Purified Talc.....	90.0 Gm.

Triturate the menthol and camphor until liquefied. Add the compound cresol solution and then the other ingredients. Mix intimately and pass through a No. 40 sieve.

## INFANT'S COUGH SYRUP

Aspirin.....	1.64 Gm.
Potassium Citrate.....	1.64 Gm.
Mucilage of Acacia.....	25.00 cc.
Syrup of Raspberry.....	25.00 cc.
Distilled Water, q. s. ad.....	100.00 cc.

Rub the aspirin with the mucilage of acacia until well suspended. Dissolve the potassium citrate in 40 cc. of the distilled water and add to the mucilage mixture. Add the syrup of raspberry and sufficient distilled water to make the product measure 100 cc.

## EXPECTORANT SYRUP

Codeine Sulfate.....	0.25 Gm.
Ammonium Chloride.....	10.00 Gm.
Spirit of Chloroform.....	6.67 cc.
Syrup of Wild Cherry, q. s. ad.....	100.00 cc.

Dissolve the codeine sulfate in the spirit of chloroform. Dissolve the ammonium chloride in the syrup of wild cherry and mix the two solutions.

## EXPECTORANT SYRUP

Codeine Sulfate.....	0.4 Gm.
Ammonium Chloride.....	3.2 Gm.
Syrup of Tolu.....	50.0 cc.
Distilled Water, q. s. ad.....	100.0 cc.

Dissolve the codeine sulfate and the ammonium chloride each in a sufficient quantity of the distilled water. Add the syrup of tolu. Add a sufficient quantity of distilled water to make the product measure 100 cc.

### SEDATIVE SYRUP

Antipyrine .....	3.0 Gm.
Sodium Bromide .....	5.0 Gm.
Syrup of Orange .....	50.0 cc.
Distilled Water, q. s. ad .....	100.0 cc.

Dissolve the antipyrine and the sodium bromide in 40 cc. of the distilled water. Add the syrup of orange. Add sufficient distilled water to make the product measure 100 cc. Mix well.

### SEDATIVE SYRUP

Ammonium Carbonate .....	3.0 Gm.
Camphorated Tincture of Opium .....	24.0 cc.
Peppermint Water .....	15.0 cc.
Syrup, q. s. ad .....	100.0 cc.

Dissolve the ammonium carbonate in the peppermint water. Add the camphorated tincture of opium and the syrup. Mix well.

### SCOTT'S SOLUTION

Mercurochrome .....	2.0 Gm.
Alcohol .....	55.0 cc.
Acetone .....	10.0 cc.
Distilled Water .....	35.0 cc.

Dissolve the mercurochrome in the distilled water and add the acetone and the alcohol.

### CASTELLANI'S STAIN

Boric Acid .....	1 Gm.
Acetone .....	5 cc.
Resorcinol .....	10 Gm.
Solution of Carbol-Fuchsin (Ziehl-Neelsen), q. s. ad .....	100 cc.

Dissolve the boric acid in 80 cc. of the solution of carbol-fuchsin, add the acetone, then the resorcinol and sufficient solution of carbol-fuchsin to make the product measure 100 cc.

## NOTES

Blank lined paper.

## This image shows a single sheet of white paper with horizontal blue or grey ruling lines, typical of notebook paper. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

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## **Administration and General Clerical Procedures**

Certain form reports and special letters are required from medical department activities by the Bureau and subordinate command units, from time to time. Instructions for the preparation and submission of each are contained in the Manual of the Medical Department.

To the uninformed it may appear that some of the reports are unnecessary. There is a sound reason, however, for each report. The information obtained from the individual reports, when combined with other individual reports, forms the basis of administrative planning, action, and correlation of statistics.

Upon the officers of the Medical Service Corps and the officers and enlisted men of the Hospital Corps the Medical Department of the Navy depends largely for the supervision and performance of required clerical procedures. To properly accomplish this responsibility, the hospital corpsman must be generally familiar with certain factors:

1. Have an intimate knowledge of the organization of the Navy, including the laws and regulations governing the naval establishment;
2. Be particularly informed of the organization of the Medical Department in relation to the Navy Department as a whole, and keep abreast of current regulations and directives of the Bureau of Medicine and Surgery; and
3. Have a complete understanding of the duties and responsibilities of the medical department ashore and afloat.

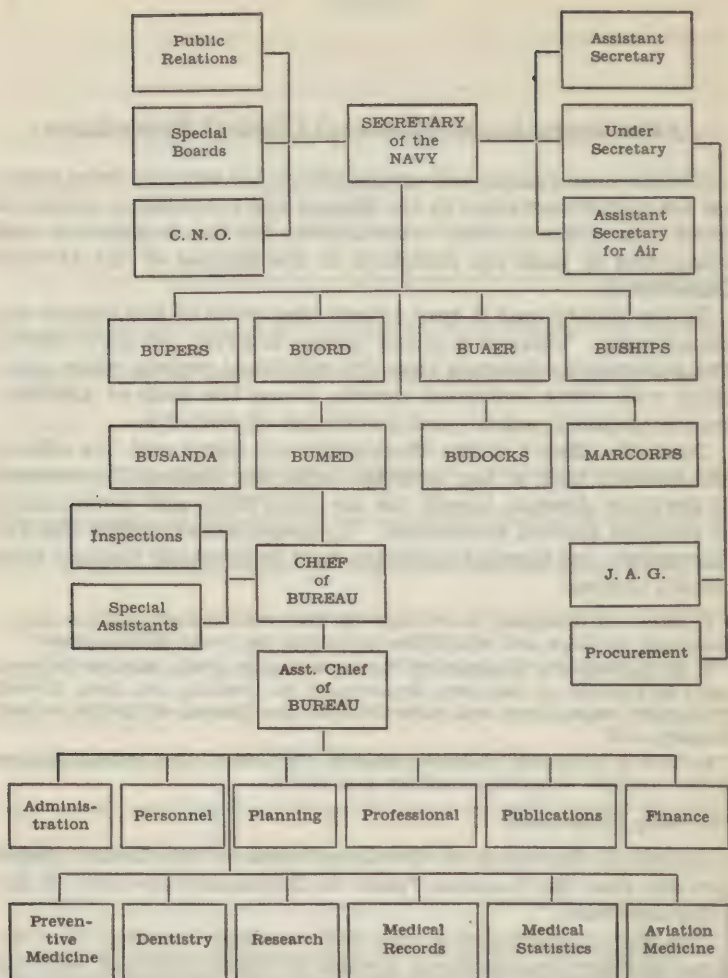
### ***The Navy Department***

Article II, Section 2, of the Constitution of the United States provides that the President "shall be Commander-in-Chief of the Army and Navy."

The Navy Department is one of three departments of the National Military Establishment (headed by the Secretary of National Defense). The Secretaries of the Navy, the Army, and the Air Force are equal in independence—but without Cabinet rank.

The Secretary of the Navy is a civil officer appointed by the President, by and with the consent of the Senate. He performs such duties as the President may assign to him or are required by law and is responsible for the preparation of naval forces necessary for the effective prosecution of war.

The organization of the Navy Department can best be shown briefly by this chart:



Navy Department organization chart showing the administrative structure in relation to BUMED. Not shown is the liaison which necessarily exists between units of below bureau level.

For a complete description of the various subdivisions of the Navy Department it is necessary to refer to other manuals and books. Prominent among these of most importance to hospital corpsmen are: Navy Regulations, Bureau of Naval Personnel Manual, Bureau of Supplies and Accounts Manual, Marine Corps Manual, Naval Orientation (NAVPERS P-16, 138), and the Blue-jackets' Manual.

## ***Bureau of Medicine and Surgery***

The Bureau of Medicine and Surgery is charged with and responsible for the health of the Navy. All administrative and physical details connected with this responsibility in accordance with established Navy Department policy are provided by the Medical Department.

To more readily accomplish the objects of the Medical Department, activities have been established at the geographical points and on shipboard where there is a concentration of naval personnel. The larger units of these Medical Department activities are naval hospitals, hospital ships and yard or station dispensaries.

It is in naval hospitals that the Medical Department's utility as a conserving force of the personnel of the Navy becomes most apparent, where its sphere of usefulness is best demonstrated and where all that pertains to the sick and injured finds its fullest development.

On 1 March 1949 the continental United States naval hospitals in commission were located at—

	<i>Commis- sioning date</i>	<i>Rated bed capacity</i>
Chelsea, Mass.....	1834	825
Newport, R. I.....	1894 <sup>1</sup>	675
Portsmouth, N. H.....	1890	150
St. Albans, N. Y.....	1943	1,200
Philadelphia, Pa.....	1935	1,300
Annapolis, Md.....	1902	200
Bethesda, Md.....	1942	1,350
Quantico, Va.....	1917	175
Portsmouth, Va.....	1832	1,200
Camp Lejeune, N. C.....	1943	300
Parris Island, S. C.....	1917	200
Charlestown, S. C.....	1917	450
Jacksonville, Fla.....	1940	500
Key West, Fla.....	1845 <sup>2</sup>	200
Pensacola, Fla.....	1875	400
Memphis, Tenn.....	1942	400
Great Lakes, Ill.....	1911 <sup>1</sup>	1,000
Corpus Christi, Tex.....	1940	400
San Diego, Calif.....	1919	1,700
Oceanside, Calif.....	1942	250
Long Beach, Calif.....	1942	1,350
Corona, Calif.....	1941	650
Oakland, Calif.....	1942	1,400
Mare Island, Calif.....	1870	700
Bremerton, Wash.....	1907	550

<sup>1</sup> In caretaker status, 1933-35.

<sup>2</sup> In caretaker status.

Naval hospitals outside the continental limits of the United States are—

Coco Solo, Canal Zone  
Guantanamo, Cuba.

Guam, Marianas Islands.

## Supplementary and Reference Books

1. USP XIII (latest edition) and Supplements.
2. NF VIII (latest edition) and Supplements.
3. United States Dispensatory, 24th edition (latest edition).
4. Merck Index, 5th edition (latest edition).
5. Textbook on Pharmacy (general).<sup>1</sup>  
Practice of Pharmacy, 9th edition, Cook.  
Principles of Pharmacy, 5th edition, Army, Fischelis.  
American Pharmacy, Vol. I, II, Lyman.
6. Textbook on Dispensing Pharmacy.<sup>1</sup>  
Dispensing Pharmacy, 1947, Husa.  
Art of Compounding, Powers-Crossen.
7. Textbooks on Pharmaceutical Arithmetic.<sup>1</sup>  
Pharmaceutical Calculations, Bradley-Gustafson.  
Pharmaceutical and Chemical Arithmetic, Sturmer.  
Arithmetic of Pharmacy, Stevens.
8. Modern Drug Encyclopedia and Therapeutic Drug Guide, and Supplements.  
Gutman (latest edition).
9. New and Nonofficial Remedies, 1947 (latest edition).
10. Pharmaceutical Recipe Book III (latest edition).
11. Textbook on Pharmacology.  
Pharmacological Basis of Therapeutics, Goodman-Gilman.  
Manual of Pharmacology, Sollmann.  
Materia Medica, Pharmacology, Therapeutics, Bastedo.
12. Medical Dictionary.
13. A Textbook on Inorganic Chemistry.<sup>1</sup>
14. A Textbook on Organic Chemistry.<sup>1</sup>
15. A Textbook on Botany.<sup>1</sup>
16. A Textbook on Hygiene and Sanitation.<sup>1</sup>
17. A Textbook on Nursing.<sup>1</sup>
18. A Textbook on Human Anatomy.<sup>1</sup>
19. A Textbook on Human Physiology.<sup>1</sup>
20. A practical Laboratory Manual.<sup>1</sup>
21. A Textbook on Nutrition and Dietetics.<sup>1</sup>
22. A Textbook on First Aid.<sup>1</sup>
23. A History of Pharmacy.<sup>1</sup>
24. U. S. Navy Manual of Naval Hygiene.<sup>1</sup>
25. U. S. Navy Manual of Epidemiology.<sup>1</sup>

In addition to the listed references, every Navy pharmacy should receive and review current medical and pharmaceutical journals and house organs of pharmaceutical manufactures. Clippings or abstracts from these should be filed to provide an up-to-date reference on new therapeutic agents.

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<sup>1</sup>Select at least one. There are many excellent books in these fields, almost any one of which may be used.

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## NOTES

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper appears to be from a notebook or a set of legal pads. There is no handwriting or other markings on the page.

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